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Loan syndication under Basel II: How do firm credit ratings affect the cost of credit?

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Abstract

This paper investigates how syndicated lenders react to borrowers' rating changes under heterogeneous conditions and different regulatory regimes. Our findings suggest that corporate downgrades that increase capital requirements for lending banks under the Basel II framework are associated with increased loan spreads and deteriorating non-price loan terms relative to downgrades that do not affect capital requirements. Ratings exert an asymmetric impact on loan spreads, as these remain unresponsive to rating upgrades, even when the latter are associated with a reduction in risk weights for corporate loans. The increase in firm borrowing costs is mitigated in the presence of previous bank-firm lending relationships and for borrowers with relatively strong performance, high cash flows and low leverage.

Keywords: corporate credit ratings, cost of credit, ratings-contingent regulation, capital requirements, Basel II

JEL classification: G21; G24; G28; G32.

1. Introduction

Credit ratings play an important role in various financing channels within the economy by providing investors with the information necessary to gauge the credit quality of financial-instrument issuers. Commercial banks, on the other hand, have traditionally conducted their own risk assessments of the credit quality of their borrowers and other investments and, thus, third-party credit ratings have been less valuable. However, the adoption of ratings-contingent capital regulation since 2004 as part of the Basel II Accord, which includes significant roles for third-party rating providers, changed the scene fundamentally. Banks have since been required to hold a sufficient level of capital against risky assets in their portfolios and, under Basel II, the appropriate risk weights applying to their assets are largely determined by external rating agencies.

Changes in borrowers' credit ratings may alter risk weights on bank loans under ratings-contingent capital regulation, thereby posing a direct impact on lending banks' capital requirements and the cost of financial intermediation. Likely, the sensitivity of banks' responses to borrowers' rating changes would be much higher for banks located in countries that already adopted the ratings-contingent regulation under Basel II in the mid to late 2000s. Prior studies suggest that sovereign credit ratings have a significant impact not only on international bank flows (see, e.g., Hasan, Kim and Wu, 2015; Hasan, Hassan, Kim and Wu, 2021) but also on syndicated loan pricing (see, e.g., Adelino and Ferreira, 2016, Drago and Gallo, 2017, 2018). This study aims to shed new light on the impact of the staggered national adoption of Basel II ratings-contingent capital rules on syndicated bank loan contracting and syndicate formation strategies.

It does so by examining 27,396 syndicated loan facilities granted by 528 lead lenders from 23 countries to borrowers from 63 countries over the period from 1998 to 2016. These data are ideal for our setting because (i) they are at the loan-level, thereby enabling the adequate

identification of causal effects, (ii) include loans from several banks to several firms in several countries, (iii) provide information about different price and non-price loan terms and (iv) can be matched with sovereign and corporate credit ratings before loan origination. We address the following research questions: First, how important are borrowing firm credit ratings for syndicated loan spreads and other loan terms? Second, are there asymmetric responses to firm rating upgrades and downgrades? Third, to what extent the adoption of Basel II (especially capital requirements mapped to the risk weights of loans) affects the strategies of international loan syndicates? Fourth, do these strategies have implications for the profitability and operating performance of downgraded firms? Lastly, what borrower characteristics mitigate the negative impact of rating downgrades on their borrowing costs?

Our findings are summarized as follows: First, loan spreads respond significantly to borrowing firms' downgrade events, while they remain unresponsive to rating upgrades. Lending banks raise spreads for loans directed to downgraded firms, since downgrades also increase the lenders' applicable Basel II risk weights. This suggests that the adoption of Basel II in the lenders' countries exerts an indirect effect on loan pricing through changes in the borrowers' credit conditions which consequently translate to higher capital charges.

Second, the impact of the Basel II risk-weighted requirements is mainly concentrated in loans from non-US banks. On the other hand, US banks raise spreads only on the undrawn part of the loan commitment following a deterioration in the borrowing firms' credit ratings. This finding is consistent with Berg, Saunders, Steffen and Streit (2017), where the usage of lines of credit is found to be much more extensive for US banks than for their European counterparts.

Third, our analysis points to the added importance of sovereign credit ratings for domestic firms' borrowing costs. We find that the interaction of sovereign rating downgrades with domestic corporate downgrades results in a significant increase in syndicated loan spreads,

especially in the period after the adoption of Basel II; importantly, this mainly concerns rating changes that lead to risk-weight increases.

Fourth, the negative effects of corporate downgrades further extend to other loan characteristics, as downgraded borrowers generally face higher collateral requirements and shorter loan maturities. Importantly, these deteriorating borrowing conditions carry adverse real effects for firms, which are evident in the period following the implementation of Basel II. We find that the higher borrowing costs of downgraded firms hurt firm profitability and performance by restricting cash flows and cash holdings, decreasing total assets and reducing the number of firm employees.

Finally, we identify potential remedies that enable affected firms to limit or even offset the aggravating effects of downgrades on their cost of credit. We conjecture that lenders will be more lenient with borrowers with pre-existing lending relationships, since they have special access to information and thus, a better understanding of those borrowers' business conditions.¹ They would, therefore, be more willing to absorb regulatory costs and be less concerned about borrowers' higher default risk levels. Indeed, we find that relationship borrowers are able to offset the increase in their loan spreads relative to first-time borrowers; importantly, this primarily concerns downgrades that lead to increases in the lending banks' risk-weighted requirements. On the same line, firms with high profitability and moderate leverage ratios can recuperate the loan spread increase following their downgrade. Hence, the migration to a different risk-weighting category does not automatically translate into a competitive disadvantage, in the form of higher borrowing costs.

Our findings have strong policy implications for the ratings-contingent regulation and the setting of risk-weighted capital requirements. In this respect, our analysis provides the first evaluation of their effectiveness in containing bank credit risk exposure and shaping bank

¹ For more details on the operation of this mechanism see Balasubramanyan, Berger and Koepke (2019).

lending behavior. We show that the real economic impact of the ratings-contingent bank regulation is evidently strongest where the regulation is most needed to curb banks' credit risk exposures to fundamental deteriorations in the credit quality of the most opaque borrowers.

The rest of this paper is organized as follows. Section 2 reviews the related research and highlights our connection to the literature, Section 3 describes the dataset and the empirical methodology, Sections 4-6 present the investigation results regarding the impact of firm rating changes on syndicated loan spreads and other loan characteristics, as well as on firm performance, and identify potential remedies for the increased cost of credit. Section 7 provides concluding remarks.

2. Literature review

The crucial role of corporate and sovereign credit rating changes for the smooth operation of the financial system is well documented. Corporate ratings affect the prices of major financial assets (e.g., bonds, stocks, and CDS), with downgrades being a fundamental driver of credit spreads and CDS spreads (see Hull, Predescu and White, 2004; Norden and Weber, 2004; Kräussl, 2005; Micu, Remolona and Wooldridge, 2006; Bales and Malikane, 2020). Corporate ratings are further material for management decisions on the optimum level of capital structure, debt and equity financing (see Kisgen, 2006, 2009; Kisgen and Strahan, 2010), while also affect firm performance and investment (see Sufi 2009; Tang 2009; Lemmon and Roberts, 2010; Chernenko and Sunderam 2012; Almeida, Cunha, Ferreira and Restrepo, 2017; Conlon, Cotter and Molyneux, 2020).

We complement the above studies by documenting how corporate credit ratings are incorporated into bank lending decisions and materialize into higher borrowing costs for downgraded firms. Importantly, we disentangle the effect of credit ratings from that of ratings-contingent regulation and show the difference on bank lending practices since the adoption of

the Basel II Accord. Given the importance of bank loans for capital allocation, we further identify the interplay of corporate ratings and regulatory reforms as an essential determinant of bank lending decisions; other determinants include the independence of corporate boards (see Francis, Hasan, Koetter and Wu, 2012), the firm's earnings predictability (see Hasan, Park and Wu, 2012) the bank's capitalization levels (see Howcroft, Kara and Marques-Ibanez, 2014; Claessens, Law and Wang, 2018) and the regulatory-market disagreement regarding the true level of bank's portfolio risk (see Delis, Kim, Politsidis and Wu, 2021).

Sovereign rating downgrades constitute an important determinant of corporate downgrades and overall firm credit risk (see Ferri Liu and Majnoni, 2001; Bedendo and Colla, 2015; Augustin, Boustanifar, Breckenfelder and Schnitzler, 2018) and further have negative spillovers on international financial markets (see Gande and Parsley, 2005; Ferreira and Gama, 2007; Drago and Gallo, 2016) and foreign direct investments (see Cai, Gan and Kim, 2018; Cai, Kim and Wu, 2019). The emergence of the sovereign-bank nexus during the Eurozone crisis confirmed that the banking sector is the primary channel for sovereign risk transmission to the economy. Through banks' high exposures to troubled countries' sovereign debt, negative developments at the sovereign level were transmitted to the domestic banking sector and ultimately the domestic economy due to reduced bank lending supply (see Popov and Van Horen, 2015; Drago and Gallo, 2016; Acharya, Eisert, Eufinger and Hirsch, 2018; Becker and Ivashina, 2018; Papadimitri, Pasiouras, Pescetto and Wohlschlegel, 2021).

In this setting, our study further distinguishes between the differential effect of sovereign and corporate credit ratings on bank lending decisions and firm borrowing costs and highlights the negative externalities connected with ratings-based regulation in the event of concurrent sovereign and corporate downgrades. For what matters, these changes result in higher borrowing costs for the affected firms following the transition to the Basel II era.

Finally, our study contributes to the literature on the bank lending channel. Previous evidence suggests that shocks to bank financial positions reduce liquidity supply across banks with a consequent impact on real economic activity (see Bernanke and Blinder, 1988; Kashyap, Lamont and Stein 1994; Black and Strahan 2002), while they can further generate contagion between banking sectors in different countries (see Daly, Batten, Mishra and Choudhury, 2019). In this regard, the US credit crunch and the global financial crisis are used as natural experiments to examine the impact of bank distress on the supply of credit and firm real outcomes (see, e.g., Ivashina and Scharfstein 2010; Cornett, McNutt, Strahan and Tehranian, 2011; Santos 2011; Chodorow-Reich, 2014; Iyer, Peydró, da-Rocha-Lopes and Schoar, 2014; Carvalho, Ferreira and Matos 2015). Other experimental settings include that of Adelino and Ferreira (2016), who exploit the asymmetric impact of sovereign downgrades on bank credit ratings due to the rating agencies' sovereign ceiling rule. This asymmetric impact leads to greater reductions in ratings-sensitive lending for banks bounded by their sovereign's rating relative to non-bounded banks.

We document how corporate credit ratings are transmitted to the bank lending channel and whether shocks to the firm's financial position are eventually reflected in their borrowing costs and real economic activity. Furthermore, we identify potential remedies that help mitigate the adverse impact of corporate downgrades. These remedies concern specific firm traits relating to certain levels of profitability and leverage and the formation of lending relationships; they enable downgraded firms to obtain bank financing without being subject to additional penalties (in the form of higher interest rate premia and other deteriorating non-price loan terms) due to the downgrade event.

3. Data and methodology

We obtain data from three sources. We obtain syndicated loan facilities (the unit of our analysis) from DealScan, which includes the most comprehensive and historical loan-deal information available on the global syndicated loan market. Our examination period is from 1998 to 2016. We omit all loans for which there is no information on loan pricing (i.e., there is no spread) and this effectively removes some very specialized credit lines. We match the loan facilities with borrowers' credit ratings on their long-term foreign currency debt and with their sovereigns' credit ratings. We consider credit ratings provided by Standard & Poor's (S&P) since S&P is generally more active and its ratings are revised more frequently, usually ahead of other CRAs (Ismailescu and Kazemi, 2010; Alsakka, ap Gwilym and Vu, 2014; Drago and Gallo, 2017; Badar and Shen, 2019). We further match loans with bank- and firm-specific information from Compustat and with macroeconomic and institutional (country-year) variables from several freely available sources. The number of loan facilities in our baseline specifications ranges from 27,317 to 27,396, depending on the set of controls used. These 27,396 loans are granted by 528 lead lenders headquartered in 23 countries to 3,989 borrowers in 63 countries (see Table 1 for key descriptive statistics and Table A1 in the Appendix for variable definitions).

3.1. Control variables

We use a number of control variables at the loan facility-level and importantly, fixed effects. Following prior studies on syndicated lending (see, e.g., Ivashina, 2009; Hasan, Hoi, Wu and Zhang, 2017; Delis, Hasan and Ongena, 2020), we control for loan amount (*Loan amount*), loan duration (*Maturity*), collateral (*Collateral*), number of lenders in the syndicate (*Number of lenders*), number of covenants in the loan contract (*General covenants*), and performance-pricing provisions (*Performance provisions*). Although not explicitly priced, these terms have a material impact on how loan contracts and syndicate structures are formed. For example,

lenders may lean toward making loans with more guarantees and lower direct costs following a corporate and/or sovereign upgrade (see Deli, Delis, Hasan and Liu, 2018; Kim, 2019).

We also control for bank characteristics, such as the return on assets (*Bank return on assets*), total assets (*Bank size*), and non-performing loans (*Bank NPLs*). Our firm controls include firm return on assets (*Firm return on assets*), Tobin's Q (*Firm Tobin's Q*), and leverage (*Firm leverage*). We further include country-pair-specific variables, such as the difference in GDP per capita between the lender's and borrower's country (*GDP per capita*), or the difference in their GDP growth rates (*GDP growth*) to account for relative differences in their economic development and macroeconomic environments.

Finally, we include fixed effects based on the purpose of the loan (e.g., corporate purposes, working capital, takeovers or acquisitions, debt repayment), and the type of loan (e.g., term loan, line of credit). We also include year, bank, firm, lender's country, borrower's country and country-pair fixed effects. These fixed effects are intended to capture any remaining effects on loan spreads stemming from bank, firm, macroeconomic, or general country-specific characteristics not isolated by the inclusion of our set of control variables.

3.2. Empirical identification

The general form of the empirical model is:

$$Cost\ of\ credit_{lt} = a_0 + a_1 Firm\ rating_{kt-1} + a_2 Controls_{kt-1} + u_{lt} \quad (1)$$

In equation (1), *Cost of credit* measures the cost of loan facility l originated at time t . The most widely used measure is the all-in spread drawn (*AISD*), denoting the spread over LIBOR. Berg, Saunders and Steffen (2016) further show the importance of fees in the overall pricing of loans. Hence, for robustness, we also consider as an alternative cost measure the all-in spread

undrawn (AISU), which is the sum of facility and commitment fees. The vector a_0 denotes different types of fixed effects, described above. *Controls* is a vector of control variables of a different dimension k , and u is a stochastic disturbance.

Firm rating is the change in the firm's numerical credit rating in the year before the loan facility start year: lower (higher) numerical credit ratings are associated with a higher (lower) credit rating and therefore, larger values of this variable reflect a deterioration in a firm's creditworthiness (Appendix Table A2 provides information on firm credit ratings and their conversions to numerical credit ratings and risk-weighting categories). This in turn, forms our primary variable of interest. We expect the coefficient a_1 on *Firm rating* to be positive and significant if a deterioration in the firm's rating is incorporated in the pricing of loans to that firm. In other words, firms face increasing borrowing costs following a rise in their credit risk.

We also distinguish between positive and negative changes in *Firm rating* by constructing the indicator variables *Firm downgrade* and *Firm upgrade* respectively, and sequentially replacing *Firm rating* as the main independent variable in our specifications. This allows us to identify potential asymmetries in the impact of corporate credit ratings on cost of credit. Such differentiation is imperative, since rating cycles are strongly asymmetric, i.e., the length and depth (duration and amplitude) of upgrade and downgrade phases are very different (see Koopman, Krussl, Lucas and Monteiro, 2009; Broto, and Molina, 2016, for evidence on sovereign ratings). Since downgrade periods tend to be shorter than those for upgrades, we expect rating downgrades to exert a greater impact on loan spreads relative to rating upgrades.

To explicitly examine the effects of Basel II ratings-based capital requirements, we directly investigate the effects of the borrowers' credit rating changes that lead to changes in risk-weight categories under Basel capital rules and those that do not. In this respect, we classify every downgrade (upgrade) into a change or non-change in the borrower's risk-weight category. The resulting binary variables, *Firm RW* and *Firm NRW*, assume the value of one

when the rating change leads to the crossing and non-crossing of risk-weight categories respectively, and zero otherwise. We then consider the separate interactions of *Firm rating* (and sequentially *Firm downgrade* and *Firm upgrade*) with *Firm RW* and *Firm NRW* respectively. Thus, in later stages our specification is of the form:

$$\begin{aligned} \text{Cost of credit}_{it} = & a_0 + a_1 \text{Firm rating}_{kt-1} \times \text{Firm RW}_{kt-1} + \\ & + a_2 \text{Firm rating}_{kt-1} \times \text{Firm NRW}_{kt-1} + a_3 \text{Controls}_{kt-1} + u_{it} \quad (2) \end{aligned}$$

Under the standardized approach to credit risk in Basel II, risk weights used to calculate capital charges are directly mapped to credit ratings and thus, rating changes across predefined rating categories necessarily lead to changes in the risk weights applied (Hasan, Kim and Wu, 2015; Hasan, Hassan, Kim and Wu, 2021).² As such, we expect rating changes that force the borrower to move to a different risk-weight category to exert a stronger effect on spreads relative to rating changes that leave the borrower in the same risk-weight category. Hence, we anticipate the estimated coefficient a_1 to be not only positive, but also greater in absolute value than the coefficient estimate for a_2 .

4. The effect of credit rating changes on the cost of credit

4.1. Baseline results

In Table 2 we report the results from the estimation of equation (1) using OLS and a different set of fixed effects, the most stringent contribution being that in column (4), where all the fixed effects are included. We use these regressions to analyze the impact of corporate credit rating

² Under both Basel II and Basel III, credit ratings provided by recognized credit rating agencies are employed in the calculation of minimum capital requirements for banks and therefore, impose operational constraints for investment funds and financial institutions; in other words, credit rating agencies provide a “certification” service for debt issuers (Kiff, Nowak and Schumacher, 2012).

changes on firm cost of credit. We report coefficient estimates and t-statistics obtained from standard errors clustered by firm. The general finding is that deteriorating corporate credit ratings (as reflected by a positive value in *Firm rating*) raise loan spreads.

Specifically, the coefficient on *Firm rating* is statistically significant at the 1% level across all specifications. A one-notch downgrade in the firm's credit rating increases *AISD* by approximately 6.3-7.5 basis points (bps). These effects are economically large and are attributable to both the firms' increasing loan demand following their rating deterioration and the risk-aversion of the lending banks. According to column (3), which constitutes our baseline specification, the effect is sizeable and equal to a 3.2% increase for the average loan in our sample. Given that the average loan size is \$669 million, firms experiencing a decrease in their rating pay, on average, approximately USD 0.43 million ($= \$669,000,000 \times 6.4 \text{ bps}$) more per year in interest expense. Moreover, for an average loan maturity of 4.13 years, this represents around USD 1.77 million in extra interest over the loan's duration.³ Considering that every firm in our sample receives, on average, 1.83 loans per year, the overall interest cost arising from the firm's total syndicated borrowing rises to USD 3.24 million ($= \$1.77 \times 1.83 \text{ loans}$).

[Insert Table 2 about here]

In Table 3, we separately consider credit rating downgrades and upgrades and re-estimate our baseline specification. In column (1), we interact *Firm rating* with *Firm downgrade dummy* to evaluate the differential effect of credit rating downgrades on loan spreads. The coefficient on *Firm rating* is no longer significant, but the interaction term picks up the significance. This suggests that the positive effect of rating changes on *AISD*, documented in Table 2, is driven by rating downgrades; the coefficient on *Firm rating* \times *Firm downgrade dummy* indicates that a downgrade raises *AISD* by approximately 7.8 bps.

³ Assuming five annual payments and LIBOR as the discount rate, the increase in interest expense equals USD 1.66 million for an average 12-month LIBOR rate of 2.8% during our sample period (for similar calculations, see Ivashina and Sun, 2011).

[Insert Table 3 about here]

This asymmetric effect of corporate downgrades on loan spreads is further verified when we replace *Firm rating* as the main explanatory variable in our baseline specification with *Firm downgrade* (column 2) and *Firm upgrade* (column 3). Estimates from column (2) indicate that downgrades directly increase loan spreads: in fact, a rating downgrade now raises *AISD* by almost 8.9 basis points. This is in turn 39% more compared to our baseline estimate, reflected in the coefficient on *Firm rating* in column (3) of Table 2. This effect is nevertheless not observed when upgrades are considered (column 3).

This result questions the credit rating agencies' information-advantage hypothesis, according to which CRAs possess information not available to the markets. Indeed, if a rating change could in practice introduce new information, we would expect to observe a significant change in loan spreads regardless of the change's direction (downgrade or upgrade). Instead, the asymmetric impact revealed in our analysis suggests that downgrades is the most relevant factor for the determination of spreads following a credit rating change.

In Appendix Table A3 we examine the sensitivity of our estimates to different types of loan, bank, firm, and macro controls. In columns (1)-(3) we confirm that our results are not subject to the "bad-controls" problem, by interchangeably excluding loan controls from our specifications. We initially omit all loan controls (column 1), and consequently, we include only variables that provide quantitative information on the loan, such as *Loan amount*, *Maturity*, and *Collateral* (column 2), or variables that include qualitative information, such as *Number of lenders*, *Performance provisions*, and *General covenants* (column 3).

In subsequent specifications, we gradually include different controls at the bank-, firm- and country-levels. These include the bank's equity to total assets (*Bank capital* in column (4)), the log of firm's total assets (*Firm total assets* in column (5)), the balance of trade between the lenders' and borrowers' countries, their difference in inflation rates and a measure of global

stock market volatility (*Trade balance*, *Inflation* and *VIX* in column (6)). Regardless of the specification employed, the coefficient on *Firm rating* retains its negative and statistically significant value. In fact, its magnitude is even stronger, ranging between 6.5 and 7.8 bps, confirming the higher cost of credit following a deterioration in the firm's credit rating.⁴

Moreover, in Appendix Table A4 we include the interactions of each our main variables of interest (*Firm rating*, *Firm downgrade* and *Firm upgrade*) with indicators based on whether the rating change leads to a change or a non-change in the borrower's risk-weighting category (*Firm RW* and *Firm NRW* respectively). Results from this exercise point to the relatively stronger response of *AISD* to rating changes resulting in a migration to a different risk-weighting category.

The size and magnitude of coefficients on the control variables in Tables 2-3 and Appendix Table A3 are generally in line with our expectations and the studies of Bae and Goyal (2009), Ivashina (2009), Cai, Saunders and Steffen (2018) and Delis, Hasan and Ongena (2020). Specifically, loan spreads decrease with loan size and increase with maturity. Moreover, higher spreads are complemented with increasing collateral requirements. We further observe that loans are more competitively priced when more lenders are included in the syndicate and more performance provisions are included in the loan contract. The behavior of bank-level variables is also largely anticipated: higher return on bank assets is associated with decreasing *AISD*, while an increase in non-performing loans is associated with higher spreads. Unsurprisingly, firms achieving higher returns on their assets and higher market-to-book-value ratios have access to lower spreads; the latter increase with the firm's leverage.

4.2. Risk weight changes and the role of Basel II

⁴ We further replicate all subsequent estimations by including these sets of bank, firm and macro controls interchangeably to ensure that our estimates are not sensitive to the set of controls used.

Thus far we have provided evidence that corporate credit rating changes have significant effects, both statistically and economically, on loan spreads. We further differentiate between downgrades and upgrades and find that the asymmetric impact is exerted by the former. We now direct our focus to whether these effects are attributable to ratings-based regulation. To this end, we augment equation (2) by interacting each of our double interaction terms (i.e., *Firm rating* with an indicator for the implementation of Basel II in the lender's country; this will enable us to assess whether the impact of rating changes that lead to different risk-weight categories is magnified when moving to the Basel II period. Since it is debatable whether the U.S. implemented Basel II in practice or migrated directly to Basel III, we distinguish between loans from non-US lenders and loans from lenders headquartered in the U.S.

[Insert Table 4 about here]

When the full sample is considered (column 1), we observe that *AISD* reacts only to rating changes that lead to a change in risk-weighting category. The coefficient on *Firm rating* \times *Firm RW* is positive and statistically significant, raising loan spreads by approximately 5.8 basis points. However, following the transition to Basel II all rating changes appear significant irrespective of whether they lead to different risk-weight categories (positive coefficients on the triple interaction terms). We consequently estimate our specification for different subsamples: these include loans granted from non-US banks (column 3) and loans granted from US banks to all borrowers (column 3) or to US borrowers only (column 4). Estimates from column (2) show that non-US banks price only rating changes that lead to risk-weight changes and only in the post-Basel II period (the coefficient on *Firm rating* \times *Firm RW* \times *Basel II*). The increase is equal to 11.6 bps, almost double the effect in column (1). Turning to columns (3) and (4), we observe that spreads on loans from US banks respond to ratings that lead to risk-weight changes (the coefficient on *Firm rating* \times *Firm RW* in either columns).

Importantly, this response is independent of the transition to Basel II, which indicates that the ratings-contingent regulation has not been incorporated into the lending activities of US banks.

We subsequently examine the asymmetric response of loan spreads during the Basel II period by re-estimating the specifications of Table 4 and replacing *Firm rating* with *Firm downgrade* and *Firm upgrade*, respectively. Results from Table 5 indicate that the asymmetry evidenced in section 4.1 is further preserved when we consider the role of ratings-based regulation. Estimates from the full sample point to a significant response of *AISD* to a combination of corporate downgrades and changes in risk-weight categories following the implementation of Basel II (the coefficients on *Firm downgrade* \times *Firm RW* \times *Basel II* and *Firm upgrade* \times *Firm RW* \times *Basel II* in columns (1) and (5) respectively).

[Insert Table 5 about here]

However, our results point to differences in the reaction of *AISD* depending on the lender's country. Spreads on loans granted from non-US lenders (column 2), exhibit increased sensitivity to downgrades that lead to changes in the firm's risk-weight category. This is specifically observed during the Basel II period and is approximately 2.3 times the gross change when not differentiating between changes and non-changes in risk-weight categories (see specification (2) in Table 3). Loans from non-US banks further display an asymmetric response to rating changes, as they remain unresponsive to all corporate upgrades (column 6).

This asymmetry is nevertheless not observed when considering loans from US lenders: *AISD* responds to both corporate downgrades and upgrades that lead to a change in a firm's risk weight (the coefficients on *Firm downgrade* \times *Firm RW* in columns (3)-(4) and on *Firm upgrade* \times *Firm RW* in columns (7)-(8)). Evidently, corporate downgrades (upgrades) can ease borrowing costs for international firms that borrow from US banks or for US firms that borrow domestically. Overall, Tables 4-5 point to the asymmetric impact of changes in risk-weight categories for both non-US and US lenders. The major difference is that for the former, this

asymmetry occurs during the Basel II period, while for the latter, its presence is independent of the regulatory regime.

4.3. Interaction between corporate and sovereign credit rating changes

We proceed with the examination of whether a sovereign rating change in the borrower's country has a significant impact on firms' borrowing costs, particularly when occurring concurrently with a corporate credit rating change. In Table 6 we interact each of our credit rating variables (*Firm rating*, *Firm downgrade* and *Firm upgrade*) with an indicator for a change in the borrower country's credit rating (*Sov rating*). To assess the impact of ratings-contingent regulation, we further include the triple interactions with an indicator for a change or non-change in the sovereign's risk weight category (*Sov RW* and *Sov NRW* respectively).

[Insert Table 6 about here]

Estimates in columns (1)-(2) confirm the impact of a sovereign rating change on loan spreads. This change is significant however, only to the extent that it causes a change in the sovereign's risk weight (the coefficient on *Firm rating* \times *Sov rating* \times *Sov RW* in column (2)). Next, we observe that the asymmetric response of *AISD* to corporate rating changes persists in the presence of sovereign rating changes. Estimates in column (3) reveal that a combination of corporate and sovereign rating change raises spreads by an additional 6.1 bps. Column (4) reveals that this is driven, and even magnified, by sovereign rating changes that lead to changes in the sovereign's risk-weight category (the coefficient on *Firm downgrade* \times *Sov rating* \times *Sov RW*). This is intuitive, since a sovereign rating change (downgrade) reflects an increase in the sovereign's credit risk which generally leads to higher risk aversion; it further points to the transmission of sovereign credit risk onto firms' credit risk (see Bedendo and Colla, 2015; Drago and Gallo, 2017). Columns (5) and (6) confirm the asymmetric effect of corporate rating

changes as corporate upgrades have no effect on *AISD*, regardless of whether they are accompanied by sovereign rating changes.

In Table 7 we examine whether the impact of sovereign downgrades varies with the origin of the lender and with the transition to the post-Basel II period. This complements the analysis of section 4.2 and the evidence that corporate downgrades are only priced in loans from non-US banks' in the post-Basel II period. Indeed, estimates from columns (5)-(8) reveal that following the transition to Basel II, changes in sovereign credit ratings magnify the impact of corporate downgrades on firms' cost of credit (the coefficients on *Firm downgrade* \times *Sov rating* and *Firm downgrade* \times *Sov rating* \times *Sov RW* respectively). Importantly, sovereign rating changes are only priced in loans granted by non-US banks. This stands in contrast to the minimal sensitivity of *AISD* in the pre-Basel II era (columns (1)-(4)). We thus highlight the negative externalities associated with the ratings-based regulation in the event of concurrent sovereign and corporate downgrades, which result in higher borrowing costs for the affected firms when borrowing from non-US banks.

[Insert Table 7 about here]

4.4. Results for *AISU*

An important extension of our analysis relates to the role of loan fees. According to Berg, Saunders and Steffen (2016), commitment plus facility fees, defined as the all-in spread undrawn (*AISU*), are larger for high-volatility firms. Thus, we might expect that riskier firms face higher borrowing costs through higher fees. A constraining factor of the global DealScan database is that the reporting of fees is limited, either because loan deals do not include specifications for undrawn funds or simply because such information is missing. Nevertheless, in Table 8 we replicate Table 2 with *AISU* as the dependent variable. Across all specifications, the coefficient on *Firm rating* is positive and statistically significant at all conventional levels,

raising *AISU* by approximately 1.3% (specification (3)); therefore, we document that credit rating changes are further priced in the fees.

[Insert Table 8 about here]

Along the lines of Table 5, we examine potential asymmetries in the response of *AISU* to changes in risk-weight categories, the implementation of Basel II and the origin of the lending bank. We present results in Table 9, where we observe an asymmetric reaction of *AISU* to corporate downgrades, only to the extent that such downgrades lead to a change in risk-weight category (the coefficient on *Firm downgrade* \times *Firm RW* \times *Basel II*). Column (1) confirms this reaction for the full sample, while, columns (3) and (4) reveal that this practice is only followed by US lenders. The latter increase *AISU* by approximately 3.0 basis points, or 10.5%, in the post-Basel II period for borrowers experiencing a simultaneous downgrade and migration to a different risk-weight category.

[Insert Table 9 about here]

On the other hand, columns (5)-(8) show that corporate upgrades have an insignificant effect on *AISU*. Taken together, estimates in Table 9 point to differences in the pricing of undrawn funds between non-US and US lenders, which complements prior evidence that the pricing structure of credit lines differs fundamentally between European and US lenders (see Berg, Saunders, Steffen and Streit, 2017). According to our analysis, US lenders further adjust (upwards) their pricing of undrawn funds following a firm's movement to a different risk-weight category; this adjustment is only observed during the post-Basel II period.

4.5. *Effect of credit rating changes on the other loan terms*

Our analysis further relates to the effect of corporate credit rating changes on additional loan terms. To this end, each of the specifications in Table 10 estimates our baseline regression by replacing *AISD* with alternative non-price loan terms, namely *Loan amount*, *Maturity*, and

Collateral. In column (1), we notice that a deterioration in the firm’s credit rating exerts a positive, albeit weakly significant, effect on loan amount. This is not entirely unexpected, as downgrades might constrain firms’ access to alternative sources of funding, causing them to resort to syndicated loan financing. Consequently, we observe that a change in credit rating reduces loan duration (column (2)).

[Insert Table 10 about here]

Our last specification (column (3)) examines the effect of *Firm rating* on collateral requirements, where we observe that loans to firms experiencing an adverse rating change are more likely to require collateral. Moreover, in Appendix Table A5 we document that, similar to loan spreads, *Collateral* also exhibits an asymmetric response to credit rating changes. In particular, the use of collateral is intensified after corporate downgrades and risk-weight changes; this is observed post-Basel II and concerns loans from non-US lenders (the positive coefficient on *Firm downgrade* \times *Firm RW* \times *Basel II* in column (2)).

4.6. Robustness Checks

Thus far our results could be subject to a sample-selection bias, in the sense that the variables driving our findings might further determine the firm’s decision to receive a loan from a specific lender. It may be, for instance, that loan spreads are affected by corporate downgrades because high credit risk firms are more likely than others to request a loan. To address this selection bias, we follow Dass and Massa (2011) and employ Heckman’s (1979) two-stage model to calculate the probability of a firm entering into a loan deal. In the first stage, we run a probit model to estimate the firm’s loan-taking decision. During this stage, we extend our loan sample and include all syndicated loan facilities available in DealScan. We calculate Heckman’s lambda (inverse mills ratio) and include it as an additional control variable in the second-stage OLS estimations.

In line with Dass and Massa (2011), we assume that the borrower's decision to obtain a syndicated loan is a function of the main determinants of the decision to borrow in general. Consequently, our probit regression is augmented with a set of loan-, bank- and firm-level characteristics; a set of weights for the number, origin, and direction of loans made in a given year; and loan purpose and type, year, bank, firm, lender's and borrower's country dummies. Our set of annual weights include the number of loans made by a given bank (*Bank loans*), the number of loans to a given firm (*Firm loans*), and the number of loans between a given bank-firm pair (*Bank-firm loans*).

We present results from this exercise in columns (1)-(3) of Appendix Table A6 (Panels A and B). Probit estimates in Panel A reveal that the higher the return on assets, the Tobin's Q and the size of the firm, the more likely is the completion of a syndicated loan deal. Loans of shorter maturity are more likely to be granted, particularly when these include collateral and carry pricing provisions and covenants. Importantly, estimates from the second-stage regressions in Panel B confirm the strong positive impact of credit rating changes on *AISD*. Furthermore, this impact is driven by corporate downgrades (columns (1) and (2)), as corporate upgrades appear to be immaterial for loan spreads (column (3)).

According to the risk-taking channel of monetary policy, a positive relationship exists between expansionary monetary policy and bank risk-taking.⁵ If low interest rates entice banks to assume greater risk positions, higher loan spreads might be attributed to within-year expansionary monetary policy. We test this premise by using a subsample consisting of the U.S., the Eurozone, Japan, and the UK, since in these countries, we can better identify the stance of non-conventional monetary policy. We consider the quarterly shadow short rate (*Shadow rate*), which provides a more accurate description of monetary policy when

⁵ Evidence on the risk-taking channel of monetary policy is provided by, among others, Jiménez, Ongena, Peydró and Saurina (2014).

interest rates are near or below the zero-lower bound, compared to the actual short rate (Krippner, 2016; Von Borstel, Eickmeier and Krippner, 2016).

Results in Appendix Table A7 confirm the importance of risk-weight changes relative to non-changes and the asymmetric effect of rating downgrades. Furthermore, the coefficients on each of the interactions with *Shadow rate* are negative and significant, supporting the positive relation between expansionary monetary policy and bank loan rates. These results are in line with Delis, Hasan and Mylonidis (2017) and Paligorova and Santos (2017), who use syndicated loans to identify the risk-taking channel in the United States.⁶

In Appendix Table A8 we further confirm the insensitivity of our estimates to the type of clustering of our standard errors; this is imperative due to the multi-level nature of our loan data. In this respect, we employ different specifications with standard errors clustered by loan facility, bank, bank *and* firm, firm *and* year, and bank *and* firm *and* year. Across all specifications, results are identical to our baseline. In unreported specifications, standard errors are also clustered at the lender's and borrower's country-level.

Thus far, all loans enter our model with equal weights. Normally, the fielding of lender's and borrower's country fixed effects in our specifications acts as a safeguard against cross-country variation. However, this allows certain countries or firms that receive relatively fewer loans to exert a disproportionate impact on our estimates. To this end, in Appendix Table A9 we re-estimate our baseline specification using weighted least squares and a number of different weights. Results from this approach are similar to those under the OLS method.

Lastly, we control for the timing of the downgrade event. Rating downgrades occurring shortly before or during loan negotiations might have a stronger effect on loan spreads since this information might not have been considered by the lending bank when setting the loan

⁶ We also experiment with specifications where the clustering of standard errors is at the bank, firm, and year level. This is necessitated by the limited number of countries, which creates the need for more micro-clustering of standard errors. We further examine the hypothesis that loan spreads are driven by the interest-rate differential between the lender's and the borrower's countries. The results remain qualitatively the same.

contract terms. Appendix Table A10 considers different frequencies for the timing of the event (daily, quarterly, bi-annually), with all alternative model specifications confirming the positive effect of corporate downgrades on *AISD*.

5. Real effects for firms

Thus far, our analysis shows that during the post-Basel II period, firms face higher borrowing costs if they experience a rating downgrade that moves them into a different risk-weight category. It is therefore likely that such financially constrained firms will be forced to forego potentially profitable investments and experience a decline in their overall performance and profitability. In fact, prior evidence for bounded firms (i.e., with a credit rating equal to the rating of the country in which they are headquartered) suggests that they cut corporate investment to a greater extent than non-bounded ones in the aftermath of a sovereign downgrade (see Almeida, Cunha, Ferreira and Restrepo, 2017). Furthermore, deteriorating corporate credit ratings can affect customer and employee relationships as well as business operations, including a firm's ability to enter into or maintain long-term contracts; hence, firms appear to react to downgrades by reducing debt issuance and leverage (see Kisgen, 2009; Kisgen and Strahan, 2010).

In this section, we trace the financial and real consequences of corporate downgrades by examining whether downgrades and resulting risk-weight changes are transmitted to the real economy through higher cost of credit in the country of the downgraded firms. Successful identification of this transmission lies in disentangling the downgrade event from the increasing spreads on the affected firms' loans. To accomplish this, we collapse our sample at the firm-year level and interchangeably employ as dependent variables a number of different firm-level characteristics. We then perform a difference-in-differences (DiD) estimation by interacting firms that experience a simultaneous downgrade and change in their risk-weight category with

the higher cost of bank credit faced by these firms following their downgrade. Our specification takes the following form:

$$\begin{aligned}
Firm\ performance_{it} = & a_0 + a_1 Firm\ downgrade\ dummy_{it-1} + \\
& + a_2 High\ borrowing\ rate_{it} + \\
& + a_3 Firm\ downgrade\ dummy_{it-1} \times High\ borrowing\ rate_{it} + \\
& + a_4 Controls_{it-1} + u_{it}
\end{aligned} \tag{3}$$

In equation (3), *Firm performance* measures the performance and profitability of a firm i at time t as reflected in the firm's cash flows and cash holdings, return on assets, total assets and employee growth. *Firm downgrade dummy* is a binary variable that equals one for a downgrade in the firm's risk-weight category at time $t - 1$ (and zero otherwise), while *High borrowing rate* is a binary variable that equals one if the borrowing rate in the firm's country is within the 75th percentile of the borrowing rate in our sample at time t (and zero otherwise). The specification further includes a vector of firm and macroeconomic controls (*Controls*) and firm and borrower's country fixed effects (a_0). The coefficient on the interaction between *Firm downgrade dummy* and *High borrowing rate* (coefficient a_3) is the main coefficient of interest. It shows the differential effect of higher cost of bank credit on operating performance between firms experiencing a risk-weight category downgrade and those that do not.

In other words, our identification strategy rests upon the fact that a higher borrowing rate is associated with, and thus affects differently, firms that have experienced a risk-weight downgrade (the treatment group), compared to firms that were downgraded but remain in the same risk-weight category or were not downgraded at all (the control group). We expect this coefficient to be positive if higher cost of bank credit is transmitted to the real economy and thus affects the performance of downgraded firms. Moreover, the coefficient a_1 shows how the

firm's risk-weight-related downgrade affects firm performance, without accounting for the resulting greater borrowing costs. If the model is well identified, the interaction term and the control variables should explain (most of) the effects of the firm's risk-weight-related downgrade on firm characteristics (i.e., α_1 should be statistically insignificant), because the effect of the risk-weight change on firm performance should be minimal or zero, especially when controlling for the accompanying higher borrowing costs.

Equation (3) is estimated twice, as we split the sample into the pre- and post-Basel II periods; we further estimate the same equation without the inclusion of the interaction term. Results from the latter estimation are presented in Table 11 and confirm the detrimental effect of risk-weight changes on borrowing firms' financial performance in the post-Basel II period. We consequently examine the differential effect of high borrowing costs faced by downgraded firms. Estimates in Table 12 reveal the limited ability of our interaction term to affect firm performance prior to Basel II implementation (columns (1)-(5)). The only exception is column (4), where firms appear to reduce total assets in response to a combination of a risk-weight-related downgrade and higher borrowing cost. The transition to the Basel II period however, marks a change in the ability of risk-weight downgrades to impede firm performance through higher cost of credit (columns (6)-(10)). The negative coefficient on the DiD term reveals that a risk-weight-related downgrade event and higher loan spreads reduce firms' cash flows by almost 14.5 million and their cash holdings in proportion to total assets by 2.1 percentage points (columns (6)-(7)). Moreover, affected firms that borrow at higher rates generate lower returns on their assets by 2.7 percentage points, while asset size also contracts (columns (8)-(9)); this size shrinkage is almost 2.5 times that evidenced in the pre-Basel II period. Last, firms re-adjust their hiring practices as reflected by the reduction in employee numbers (column (10)).

[Insert Tables 11 and 12 about here]

Overall, this section suggests that corporate downgrades leading to risk-weight changes carry significant negative effects for firm performance and profitability due to higher cost of bank credit following the downgrade event. On the other hand, downgraded firms that manage to maintain their cost of credit at relatively low levels are much less affected. These adverse real effects for firms are evident after the implementation of Basel II. We thus highlight the competitive disadvantages of the ratings-contingent regulation for downgraded firms.

6. When it pays to borrow

In this section, we perform a number of tests to identify how firms can alleviate the adverse effects of corporate downgrades on their borrowing costs and maintain their ability to borrow at competitive rates after the downgrade event. Among the different ways we consider, are the establishment of lending relationships, achieving certain performance and profitability levels and managing their capital structure towards levels.

6.1. Relationship lending

Prior relationships between lenders and borrowers allow the former to acquire valuable information about the latter's operations and credit risk. Given this, lenders are much more likely to make future loans to previous borrowers than new borrowers, while spreads on relationship loans can be 10-17 basis points lower relative to first-time loans (see Bharath, Dahiya, Saunders and Srinivasan, 2007, 2011). We therefore, expect that firms with prior relationships with their lending banks are able to recover part of the higher loan spread following the downgrade event. We test this assumption in Table 13, by interacting our variables of main interest with *Relationship lending*, a variable reflecting the existence of a prior lending relationship between the given bank-firm pair in the previous 3-year period.

[Insert Table 13 about here]

Estimates in columns (1)-(3) refer to the pre-Basel II period and indicate that repeated borrowing from the same bank has no effect on loan spreads of affected firms (based on the triple interactions with *Relationship lending*). However, relationship ties gain in importance in the post-Basel II period: relationship borrowers can recover more than 85% of the initial spread charged due to the downgrade and the resulting change in the firm's risk weight (the coefficients on *Firm downgrade* \times *Firm RW* and on *Firm downgrade* \times *Firm RW* \times *Relationship lending* in column (5)). As expected, no loan-pricing effect exists for upgraded firms (column (6)), as their lower credit risk alleviates the need to resort to the same bank for funding.

6.2. Firm-characteristics

We next turn to potential performance, profitability and capital-structure characteristics that enable firms to access the syndicated loan market without being penalized for being downgraded; we do so by replacing our relationship lending measures with a set of relevant firm-level characteristics. Results are presented in Table 14 and suggest that profitable firms (as measured by return on assets and profitability) can entirely offset the spread increase due to the downgrade event; this is evident in cases of risk-weight changes (the coefficients on triple interactions in columns (1)-(2)). Furthermore, banks favourably perceive specific corporate actions, such as an increase in the number of employees or in the level of cash flows and retained earnings, since these actions mitigate the negative impact of downgrades on *AISD* (triple interactions with *Number of employees*, *Cash flows*, and *Retained earnings* in columns (3)-(5)). However, an increase in firm indebtedness (debt level or leverage) produces the exact opposite effect, as suggested by the positive coefficients on the triple interactions with *Total debt* and *Firm Leverage* (columns (6) and (7) respectively).⁷

⁷ When we replicate Table 14 for the pre-Basel II period, most of the triple interactions come with a non-statistically significant coefficient (not reported here for brevity).

[Insert Table 14 about here]

We investigate these firm characteristics further by conducting quartile subsample estimations. This will enable us to identify the threshold for each characteristic that exerts this mitigating impact. To do so, in Table 15 we replicate Table 14 by considering each of the quartiles for our firm-level variables. Moreover, Table 16 presents the associated values of these variables across the three 25th percentiles. Estimates from Table 15 reveal that this mitigating effect is significant only for firms in the top quartile in terms of performance, with the exception of *Retained earnings*, where the alleviating effect is significant only for firms in the top 25th and 50th percentiles. For example, the coefficient on *Firm return on assets* turns negative and significant only for values in the top 25th percentile (the highest ROA group). This corresponds to values above 13.3% per annum (see column (3) of Table 16), indicating that firms above that threshold can fully offset the spread increase due to a risk-weight change.

[Insert Table 15 and 16 about here]

A similar threshold is calculated for *Retained earnings* and is located in the second quartile, the point where retained earnings turn from negative to positive (see column (2) in Table 15 and column (1) in Table 16 respectively). Hence, downgraded firms with negative retained earnings experience an additional increase in their borrowing costs. Along the same lines, firms in the bottom quartile in terms of *Asset growth* experience even greater increases in *AISD* as evidenced by the positive and significant coefficient on the triple interaction term (column (2) in Table 15). This suggests that lenders punish the worst performers when they come to the syndicated loan market after experiencing a rating downgrade in the prior year, while giving downgraded but high-performing firms the benefit of the doubt.

Regarding debt-related firm characteristics, we find that highly leveraged firms in the top quartile of our sample experience further increases in *AISD* when they are downgraded (column (5) in Table 15). The corresponding thresholds for *Total debt* and *Firm leverage*

correspond to values of USD 6.4 billion and 46.9% respectively (column (3) in Table 16). Nevertheless, downgraded firms with debt levels below these values do not experience an increase in their borrowing costs.

6.3. Summing up

Overall, the results in this section suggest that the effect of ratings-contingent regulation on firm cost of credit is not homogeneous across borrowers. In fact, it largely depends on firm performance and capital structure decisions as well as on prior interaction with the lending bank. A direct corollary of our empirical analysis is that corporate downgrades resulting in risk-weighting changes do not constitute a deterrent for firms aiming to obtain syndicated loan financing. We document that strongly performing firms with relatively low debt levels and prior lending relationships can still access the syndicated loan market at competitive rates without being subjected to discipline.

7. Conclusion

This paper investigates whether bank lending behavior in response to corporate credit rating events varies under certain conditions. It specifically examines how syndicated loan spreads respond to rating changes with or without a corresponding risk-weight change under Basel II and whether different borrowing firm characteristics are able to affect this response. Our results reveal a number of interesting findings that both confirm various *a priori* expectations and provide important new insights into the impact of ratings-contingent regulation on bank lending practices since the adoption of the Basel II Accord.

Our analysis shows that lenders react to corporate downgrades by raising loan spreads, increasing collateral requirements, and reducing loan maturities; corporate upgrades do not, in general, elicit a significant response. Our findings lend support for the efficacy of Basel II

Accord in terms of evoking conservative lending decisions by banks in the face of a change in the borrowers' credit ratings. Furthermore, this response is limited to downgrades that specifically increase Basel II risk weights applied on risky assets and is mainly concentrated in loans from non-US banks. Importantly, rating changes carry real effects, since corporate downgrades coupled with higher borrowing costs result in worse firm performance.

We additionally reveal the heterogeneous effect of ratings-contingent regulation on firm cost of credit. This effect is largely dependent on firm performance, as relationship borrowers with high profitability and moderate leverage ratios can recuperate, and even fully offset, the loan spread increase following their downgrade. Hence, the migration to a different risk-weighting category does not automatically translate into a competitive disadvantage in the form of increased borrowing costs.

Our research indicates that the adoption of Basel II capital regulation with its refined system of asset risk-weighting (depending on the borrowers' risk profile) has the desired impact on lending banks. Our findings highlight the difficulties inherent in the regulatory authorities' attempt to calibrate capital requirements to accurately reflect bank portfolio risks. They are also relevant for ongoing reforms to improve the global financial architecture. Of particular interest is the examination of whether corporate downgrades further alter firm borrowing behavior, as well as firms' choices between alternative financing sources; we leave that for future research.

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Table 1. Summary statistics

The table reports summary statistics (number of observations, mean, standard deviation, minimum and maximum values) for all variables used in the estimations of the main text. All variables are defined in Table A1.

	Obs.	Mean	Std. dev.	Min.	Max.
AISD	27,396	202.47	162.68	-3.00	1,600.00
AISU	13,435	28.58	25.18	0.75	450.00
Firm rating	27,396	0.06	0.95	-7.00	6.00
Firm downgrade dummy	27,396	0.13	0.34	0.00	1.00
Firm downgrade	24,237	0.25	0.75	0.00	6.00
Firm upgrade	23,820	0.18	0.60	0.00	7.00
Firm RW	27,396	0.07	0.26	0.00	1.00
Firm NRW	27,396	0.93	0.26	0.00	1.00
Sovereign rating	27,368	0.03	0.44	-9.00	12.00
Sov RW	27,374	0.01	0.10	0.00	1.00
Sov NRW	27,374	0.99	0.10	0.00	1.00
Loan amount	27,396	19.42	1.40	12.47	24.62
Maturity	27,396	49.57	27.72	1.00	1,140.00
Collateral	27,396	0.44	0.50	0.00	1.00
Number of lenders	27,396	10.25	9.31	1.00	29.00
Performance provisions	27,396	0.33	0.47	0.00	1.00
General covenants	27,396	1.01	1.36	0.00	7.00
Relationship lending	27,396	0.34	0.47	0.00	1.00
Bank return on assets	27,396	0.01	0.02	-0.02	0.28
Bank size	27,396	12.04	1.53	5.89	17.81
Bank NPLs	27,396	0.02	0.02	0.00	0.31
Firm return on assets	27,396	0.06	0.08	-0.51	0.31
Firm Tobin's Q	27,396	1.53	0.49	0.23	5.00
Firm leverage	27,396	0.39	0.20	0.00	1.97
GDP per capita	27,396	-1,614.76	10,538.79	-80,909.59	66,633.97
GDP growth	27,396	0.26	1.40	-10.92	25.59
Basel II	26,894	0.43	0.49	0.00	1.00

Table 2. Baseline results with different fixed effects

The table reports coefficients and t-statistics [in brackets]. The dependent variable is *AISD* and all variables are defined in Table A1. The estimation method is OLS with standard errors clustered by firm. Each specification includes a different set of fixed effects, as given in the penultimate part of the table. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
Firm rating	7.450*** [6.381]	6.421*** [5.744]	6.421*** [5.737]	6.275*** [5.542]
Loan amount	-4.913*** [-5.051]	-5.584*** [-5.733]	-5.584*** [-5.726]	-5.881*** [-6.045]
Maturity	0.105** [2.456]	0.257*** [4.583]	0.257*** [4.578]	0.260*** [4.626]
Collateral	31.745*** [8.620]	27.702*** [8.062]	27.702*** [8.052]	27.776*** [7.979]
Number of lenders	-0.784*** [-6.381]	-0.879*** [-7.566]	-0.879*** [-7.557]	-0.885*** [-7.605]
Performance provisions	-29.466*** [-12.566]	-29.035*** [-13.531]	-29.035*** [-13.516]	-29.413*** [-13.547]
General covenants	2.348** [2.163]	2.786*** [2.720]	2.786*** [2.717]	2.774*** [2.693]
Bank return on assets	-159.540*** [-5.431]	-152.489*** [-5.590]	-152.489*** [-5.584]	-151.439*** [-5.510]
Bank size	0.044 [0.110]	0.036 [0.095]	0.036 [0.094]	0.034 [0.090]
Bank NPLs	136.327*** [5.288]	131.039*** [5.353]	131.039*** [5.346]	129.490*** [5.249]
Firm return on assets	-135.856*** [-5.408]	-108.337*** [-4.703]	-108.337*** [-4.697]	-112.613*** [-4.816]
Firm Tobin's Q	-49.692*** [-13.252]	-34.720*** [-10.582]	-34.720*** [-10.570]	-35.037*** [-10.584]
Firm leverage	188.610*** [12.117]	173.767*** [12.032]	173.767*** [12.018]	172.209*** [11.794]
GDP per capita	-0.006*** [-4.128]	-0.003** [-2.573]	-0.003** [-2.570]	-0.004*** [-2.868]
GDP growth	-2.075** [-2.461]	-0.334 [-0.450]	-0.334 [-0.450]	-0.010 [-0.012]
Constant	294.215*** [14.090]	287.402*** [14.215]	287.402*** [14.198]	294.049*** [14.681]
Observations	27,396	27,396	27,396	27,317
Adj. R-squared	0.675	0.714	0.713	0.715
Loan purpose and type	Y	Y	Y	Y
Year effects	Y	Y	Y	Y
Bank effects	Y	Y	Y	Y
Firm effects	Y	Y	Y	Y
Lender's country effects	N	Y	Y	Y
Borrower's country effects	N	N	Y	Y
Country-pair effects	N	N	N	Y
Number of banks	528	528	528	525
Number of firms	3989	3989	3989	3973

Table 3. The asymmetric response of spreads to credit rating changes

The table reports coefficients and t-statistics [in brackets]. The dependent variable is *AISD*, and all variables are defined in Table A1. The estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specification (1), we interact *Firm rating* with *Firm downgrade dummy*, i.e., a binary variable equal to one if firm is downgraded, and zero otherwise. In specification (2), we replace *Firm rating* with *Firm downgrade*, i.e., the positive changes and non-changes in the borrower's numerical credit rating in the year before the loan facility's origination year. In specification (3), we interact *Firm rating* with *Firm upgrade*, i.e., the negative changes and non-changes in the borrower's numerical credit rating in the year before the loan facility's origination year. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)
Firm rating	1.948 [1.408]		
Firm rating × Firm downgrade dummy	7.828** [2.253]		
Firm downgrade		8.857*** [4.846]	
Firm upgrade			-0.994 [-0.747]
Firm downgrade dummy	-0.049 [-0.009]		
Loan amount	-5.551*** [-5.694]	-5.156*** [-4.934]	-5.238*** [-5.300]
Maturity	0.259*** [4.587]	0.258*** [4.338]	0.245*** [4.217]
Collateral	27.617*** [8.062]	26.577*** [7.111]	26.343*** [7.600]
Number of lenders	-0.880*** [-7.584]	-0.939*** [-7.891]	-0.731*** [-6.673]
Performance provisions	-28.954*** [-13.501]	-30.121*** [-13.104]	-23.763*** [-11.418]
General covenants	2.734*** [2.671]	3.254*** [2.965]	1.558 [1.519]
Bank return on assets	-152.356*** [-5.585]	-148.911*** [-5.034]	-100.807*** [-3.818]
Bank size	0.059 [0.156]	-0.010 [-0.024]	0.226 [0.598]
Bank NPLs	130.712*** [5.338]	132.553*** [4.958]	115.758*** [4.776]
Firm return on assets	-104.726*** [-4.527]	-96.517*** [-3.798]	-129.328*** [-5.357]
Firm Tobin's Q	-34.665*** [-10.616]	-36.399*** [-10.057]	-30.527*** [-9.272]
Firm leverage	173.063*** [11.913]	182.013*** [11.394]	161.034*** [11.057]
GDP per capita	-0.003** [-2.554]	-0.004*** [-2.610]	-0.004*** [-3.685]
GDP growth	-0.327 [-0.443]	0.327 [0.381]	-0.164 [-0.220]
Constant	285.021*** [14.105]	278.541*** [12.942]	269.523*** [13.127]
Observations	27,396	24,114	23,656
Adj. R-squared	0.714	0.716	0.730
Fixed effects	Y	Y	Y
Number of banks	528	505	482
Number of firms	3989	3777	3718

Table 4. The response of spreads to risk weight changes and the role of Basel II

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Firm RW* (i.e., a binary variable equal to one for a change in the firm's risk-weighting category, and zero otherwise), *Firm NRW* (i.e., a binary variable equal to one for a non-change in the firm's risk-weighting category, and zero otherwise), and *Basel II* (i.e., a binary variable equal to one for the implementation of Basel II in the lender's country, and zero otherwise). The dependent variable is *AISD*, and all variables are defined in Table A1. The estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In all specifications, we exclusively interact *Firm rating* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Basel II*. In specification (1), we include all loans. In specification (2), we exclude loans from US lenders. In specification (3), we only include loans from US lenders. In specification (4), we only include loans from US lenders to US borrowers. All specifications include loan purpose and type, year, bank and firm fixed effects. Specification (3) additionally includes borrower's country fixed effects. Specifications (1) and (2) additionally include lender's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) All loans	(2) Non-US lenders	(3) US lenders	(4) US loans
Firm rating × Firm RW	5.758*** [3.579]	-0.026 [-0.011]	8.178*** [3.771]	7.196*** [3.565]
Firm rating × Firm NRW	2.383 [1.088]	5.991 [1.571]	3.425 [1.411]	4.434* [1.810]
Firm rating × Firm RW × Basel II	6.745* [1.935]	11.597** [2.200]	1.351 [0.289]	1.973 [0.412]
Firm rating × Firm NRW × Basel II	5.846* [1.723]	-0.169 [-0.034]	4.622 [1.038]	2.984 [0.661]
Basel II	-10.194 [-0.998]	32.854 [1.294]		
Observations	26,257	7,734	18,523	17,382
Adj. R-squared	0.716	0.754	0.723	0.727
Full set of controls	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y
Number of banks	491	201	290	274
Number of firms	3843	1652	2932	2652

Table 5. The asymmetric response of spreads to risk weight changes and the role of Basel II

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Firm RW* (i.e., a binary variable equal to one for a change in the firm's risk-weighting category, and zero otherwise), *Firm NRW* (i.e., a binary variable equal to one for a non-change in the firm's risk-weighting category, and zero otherwise), and *Basel II* (i.e., a binary variable equal to one if Basel II is implemented in the lender's country, and zero otherwise). The estimation is conducted for the full sample of loans and certain subsamples of loans. The dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specifications (1)-(4), we exclusively interact *Firm downgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Basel II*. In specifications (5)-(8), we exclusively interact *Firm upgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Basel II*. In specifications (1) and (5), we include all loans. In specifications (2) and (6), we exclude loans from US lenders. In specifications (3) and (7), we only include loans from US lenders. In specification (4) and (8), we only include loans from US lenders to US borrowers. All specifications include loan purpose and type, year, bank and firm fixed effects. Specifications (3) and (7) additionally include borrower's country fixed effects. Specifications (1), (2), (5) and (6) additionally include lender's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) All loans	(2) Non-US lenders	(3) US lenders	(4) US loans	(5) All loans	(6) Non-US lenders	(7) US lenders	(8) US loans
Firm downgrade × Firm RW	5.785** [2.348]	-4.044 [-0.680]	8.338*** [2.948]	7.092*** [2.745]				
Firm downgrade × Firm NRW	4.788 [1.398]	9.826* [1.699]	5.601 [1.574]	5.715 [1.587]				
Firm downgrade × Firm RW × Basel II	11.055** [2.194]	20.424** [2.464]	10.465 [1.456]	10.943 [1.515]				
Firm downgrade × Firm NRW × Basel II	8.887 [1.489]	-1.329 [-0.140]	11.929 [1.621]	11.715 [1.563]				
Firm upgrade × Firm RW					-4.547** [-2.390]	-0.359 [-0.146]	-7.850** [-2.100]	-8.105** [-2.200]
Firm upgrade × Firm NRW					3.245 [0.964]	-1.11 [-0.229]	2.506 [0.565]	-1.511 [-0.369]
Firm upgrade × Firm RW × Basel II					1.279 [0.286]	3.814 [0.496]	5.408 [0.807]	7.016 [1.011]
Firm upgrade × Firm NRW × Basel II					-11.116** [-2.458]	-6.251 [-0.873]	-8.721 [-1.447]	-3.986 [-0.683]
Basel II	-16.602 [-1.372]	-6.159 [-0.227]			-5.485 [-0.608]	63.492*** [2.628]		
Observations	23,052	6,539	16,513	15,580	22,534	6,688	15,844	14,865
Adj. R-squared	0.720	0.786	0.728	0.732	0.735	0.765	0.744	0.747
Full set of controls	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Number of banks	467	185	282	267	445	182	263	245
Number of firms	3640	1490	2792	2550	3580	1507	2711	2471

Table 6. The response of spreads to sovereign risk weight changes

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Sov rating* (i.e., the change in the sovereign's numerical credit rating), *Sov RW* (i.e., a binary variable equal to one for a change in the sovereign's risk-weighting category, and zero otherwise), and *Sov NRW* (i.e., a binary variable equal to one for a non-change in the sovereign's risk-weighting category, and zero otherwise). The dependent variable is *AISD* and all variables are defined in Table A1. The estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specifications (1), (3), and (5), we interact *Firm rating*, *Firm downgrade*, and *Firm upgrade* respectively, with *Sov rating*. In specifications (2), (4), and (6), we exclusively interact *Firm rating*, *Firm downgrade*, and *Firm upgrade* respectively, with *Sov rating*, and further interact each double interaction term with *Sov RW* and *Sov NRW* respectively. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Firm rating	6.381*** [5.654]	6.448*** [5.765]				
Firm rating × Sov rating	2.459 [1.206]					
Firm rating × Sov rating × Sov RW		5.616*** [2.992]				
Firm rating × Sov rating × Sov NRW		-1.357 [-0.717]				
Firm downgrade			8.375*** [4.577]	8.472*** [4.605]		
Firm downgrade × Sov rating			6.137*** [2.627]			
Firm downgrade × Sov rating × Sov RW				6.807*** [3.267]		
Firm downgrade × Sov rating × Sov NRW				0.720 [0.132]		
Firm upgrade					-0.837 [-0.602]	-0.935 [-0.665]
Firm upgrade × Sov rating					1.860 [1.224]	
Firm upgrade × Sov rating × Sov RW						0.538 [0.294]
Firm upgrade × Sov rating × Sov NRW						2.320 [1.349]
Sov rating	0.924 [0.331]	-1.286 [-0.499]	-2.841 [-0.818]	-2.689 [-0.776]	-0.905 [-0.324]	-0.978 [-0.350]
Observations	27,322	27,322	24,060	24,060	23,605	23,605
Adj. R-squared	0.713	0.714	0.716	0.716	0.730	0.730
Full set of controls	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y
Number of banks	525	525	502	502	481	481
Number of firms	3975	3975	3767	3767	3706	3706

Table 7. Asymmetric response of spreads to sovereign risk weight changes and the role of Basel II

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Sov rating* (i.e., the change in the sovereign's numerical credit rating), *Sov RW* (i.e., a binary variable equal to one for a change in the sovereign's risk-weighting category, and zero otherwise), and *Sov NRW* (i.e., a binary variable equal to one for a non-change in the sovereign's risk-weighting category, and zero otherwise). The estimation is conducted for the full sample (all loans) and the subsample of loans from non-US lenders, and for different subperiods with the threshold being the implementation of Basel II in the lender's country. Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specifications (1)-(2) and (5)-(6), we interact *Firm downgrade* with *Sov rating*. In specifications (3)-(4) and (7)-(8), we interact *Firm downgrade* with *Sov rating*, and further interact the double interaction term with *Sov RW* and *Sov NRW* respectively. In specifications (1) and (3), and (2) and (4), we include all loans, and loans from non-US lenders respectively, and conduct the estimation for the period before the implementation of Basel II in the lender's country. In specifications (5) and (7), and (6) and (8), we include all loans, and loans from non-US lenders respectively, and conduct the estimation for the period after the implementation of Basel II in the lender's country. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Pre-Basel II				Post-Basel II			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All loans	Non-US lenders	All loans	Non-US lenders	All loans	Non-US lenders	All loans	Non-US lenders
Firm downgrade	6.837*** [3.095]	-0.152 [-0.027]	6.834*** [3.092]	0.079 [0.014]	7.270** [2.397]	1.286 [0.247]	7.689** [2.429]	1.348 [0.243]
Firm downgrade × Sov rating	1.881 [0.233]	-3.063 [-0.285]			6.646*** [2.924]	8.014*** [4.505]		
Firm downgrade × Sov rating × Sov RW			0.763 [0.058]	9.723 [0.634]			7.078*** [3.558]	8.021*** [4.610]
Firm downgrade × Sov rating × Sov NRW			2.239 [0.267]	-8.918 [-0.770]			0.794 [0.094]	7.534 [0.706]
Sov rating	-6.183 [-1.096]	3.529 [0.633]	-6.168 [-1.093]	3.436 [0.615]	-5.849 [-1.317]	-2.353 [-0.442]	-5.854 [-1.320]	-2.337 [-0.439]
Observations	13,453	2,605	13,453	2,605	9,599	3,635	9,599	3,635
Adj. R-squared	0.715	0.680	0.715	0.680	0.754	0.809	0.754	0.809
Full set of controls	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Number of banks	360	130	360	130	219	101	219	101
Number of firms	2599	692	2599	692	2100	922	2100	922

Table 8. Results for AISU

The table reports coefficients and t-statistics [in brackets]. Dependent variable is *AISU* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. Each specification includes a different set of fixed effects, as given in the penultimate part of the table. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	AISU	AISU	AISU	AISU
Firm rating	0.459** [2.243]	0.363* [1.758]	0.363* [1.756]	0.367* [1.741]
AISD	0.136*** [16.902]	0.132*** [12.328]	0.132*** [12.313]	0.130*** [12.036]
Loan amount	-1.006*** [-3.410]	-0.615** [-2.203]	-0.615** [-2.200]	-0.589** [-2.118]
Maturity	0.028** [2.406]	0.052*** [4.999]	0.052*** [4.993]	0.054*** [5.105]
Collateral	3.281*** [4.185]	3.500*** [4.290]	3.500*** [4.285]	3.596*** [4.373]
Number of lenders	-0.015 [-0.583]	-0.036 [-1.366]	-0.036 [-1.365]	-0.048* [-1.881]
Performance provisions	-0.052 [-0.126]	-0.504 [-1.185]	-0.504 [-1.184]	-0.513 [-1.191]
General covenants	-0.048 [-0.187]	-0.119 [-0.429]	-0.119 [-0.429]	-0.123 [-0.443]
Bank return on assets	12.941* [1.660]	12.199 [1.597]	12.199 [1.595]	13.306* [1.727]
Bank size	0.071 [1.017]	0.067 [0.976]	0.067 [0.975]	0.086 [1.265]
Bank NPLs	1.167 [0.242]	1.022 [0.213]	1.022 [0.213]	1.093 [0.228]
Firm return on assets	-0.599 [-0.182]	0.457 [0.139]	0.457 [0.139]	0.087 [0.026]
Firm Tobin's Q	-1.079** [-2.302]	-0.735* [-1.653]	-0.735* [-1.651]	-0.760* [-1.689]
Firm leverage	-0.631 [-0.320]	0.068 [0.034]	0.068 [0.034]	-0.089 [-0.043]
GDP per capita	-0.000 [-0.811]	-0.000 [-1.023]	-0.000 [-1.022]	-0.000 [-0.396]
GDP growth	0.223 [0.624]	0.308 [0.849]	0.308 [0.848]	0.348 [0.852]
Constant	26.640*** [4.847]	18.264*** [3.421]	18.264*** [3.417]	17.871*** [3.346]
Observations	12,624	12,624	12,624	12,585
Adj. R-squared	0.763	0.768	0.767	0.768
Loan purpose and type	Y	Y	Y	Y
Year effects	Y	Y	Y	Y
Bank effects	Y	Y	Y	Y
Firm effects	Y	Y	Y	Y
Lender's country effects	N	Y	Y	Y
Borrower's country effects	N	N	Y	Y
Country-pair effects	N	N	N	Y
Number of banks	288	288	288	287
Number of firms	2369	2369	2369	2361

Table 9. Asymmetric response of AISU to risk weight changes and the role of Basel II

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Firm RW* (i.e., a binary variable equal to one for a change in the firm's risk-weighting category, and zero otherwise), *Firm NRW* (i.e., a binary variable equal to one for a non-change in the firm's risk-weighting category, and zero otherwise), and *Basel II* (i.e., a binary variable equal to one if Basel II is implemented in the lender's country, and zero otherwise). The estimation is conducted for the full sample of loans and certain subsamples of loans. Dependent variable is *AISU* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specifications (1)–(4), we exclusively interact *Firm downgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Basel II*. In specifications (5)–(8), we exclusively interact *Firm upgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Basel II*. In specifications (1) and (5), we include all loans. In specifications (2) and (6), we exclude loans from US lenders. In specifications (3) and (7), we only include loans from US lenders. In specification (4) and (8), we only include loans from US lenders to US borrowers. All specifications include loan purpose and type, year, bank and firm fixed effects. Specifications (3) and (7) additionally include borrower's country fixed effects. Specifications (1), (2), (5) and (6) additionally include lender's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) All loans	(2) Non-US lenders	(3) US lenders	(4) US loans	(5) All loans	(6) Non-US lenders	(7) US lenders	(8) US loans
Firm downgrade × Firm RW	-0.188 [-0.457]	0.341 [0.287]	-0.334 [-0.730]	-0.395 [-0.869]				
Firm downgrade × Firm NRW	0.307 [0.679]	2.322 [1.255]	0.146 [0.322]	0.184 [0.399]				
Firm downgrade × Firm RW × Basel II	2.618** [2.079]	2.552 [1.095]	3.008** [2.051]	2.907** [1.971]				
Firm downgrade × Firm NRW × Basel II	0.332 [0.385]	-0.462 [-0.181]	0.293 [0.313]	0.287 [0.300]				
Firm upgrade × Firm RW					-0.564 [-1.370]	-1.709** [-2.118]	-0.148 [-0.360]	-0.136 [-0.336]
Firm upgrade × Firm NRW					0.971 [1.455]	2.067* [1.810]	0.185 [0.304]	0.143 [0.237]
Firm upgrade × Firm RW × Basel II					0.729 [0.921]	1.313 [0.757]	0.414 [0.584]	0.601 [0.843]
Firm upgrade × Firm NRW × Basel II					-1.381* [-1.726]	-2.251 [-1.593]	-0.424 [-0.556]	-0.253 [-0.338]
Basel II	-1.861 [-0.519]	6.101 [0.752]			0.245 [0.096]	3.899 [0.684]		
Observations	10,601	1,727	8,874	8,637	10,232	1,730	8,519	8,276
Adj. R-squared	0.775	0.845	0.755	0.754	0.792	0.870	0.768	0.768
Full set of controls	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Number of banks	256	80	176	169	245	79	166	159
Number of firms	2117	518	1825	1747	2063	528	1764	1688

Table 10. Response of other loan characteristics to credit rating changes

The table reports coefficients and t-statistics [in brackets]. The dependent variable is denoted in the second line of the table and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Loan amount	(2) Maturity	(3) Collateral
Firm rating	0.013* [1.920]	-0.619*** [-3.736]	0.008** [2.453]
AISD	-0.000*** [-5.830]	0.013*** [6.565]	0.000*** [7.558]
Loan amount		2.237*** [9.403]	0.001 [0.303]
Maturity	0.004*** [4.601]		0.001*** [5.969]
Collateral	0.008 [0.303]	7.466*** [12.667]	
Number of lenders	0.021*** [12.906]	0.132*** [4.159]	-0.002*** [-3.511]
Performance provisions	0.086*** [4.794]	0.382 [0.859]	0.007 [1.070]
General covenants	-0.013* [-1.697]	0.494*** [2.714]	0.064*** [16.511]
Bank return on assets	0.088 [0.348]	-8.838* [-1.744]	-0.043 [-0.531]
Bank size	0.009** [2.452]	-0.102 [-1.307]	-0.001 [-0.493]
Bank NPLs	-0.236 [-1.042]	8.279 [1.541]	-0.005 [-0.068]
Firm return on assets	0.145 [1.089]	6.051** [1.977]	-0.108* [-1.800]
Firm Tobin's Q	0.048* [1.927]	0.433 [0.818]	-0.013 [-1.251]
Firm leverage	-0.109 [-1.644]	-1.632 [-0.722]	0.132*** [3.781]
GDP per capita	0.000 [0.852]	0.000 [0.836]	-0.000 [-0.158]
GDP growth	0.009 [1.094]	-0.301 [-1.160]	0.001 [0.182]
Constant	18.985*** [257.127]	-0.554 [-0.109]	0.232*** [3.860]
Observations	27,396	27,396	27,396
Adj. R-squared	0.680	0.488	0.706
Fixed effects	Y	Y	Y
Number of banks	528	528	528
Number of firms	3989	3989	3989

Table 11. Real effects for downgraded firms

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion *Firm RW downgrade* (i.e., a binary variable equal to one for a downgrade in the firm's risk-weighting category, and zero otherwise), and *High borrowing rate* (i.e., a binary variable equal to one if the borrowing rate in the borrower's country is within the 75th percentile of the borrowing rate in our sample, and zero otherwise). The estimation is conducted for different subperiods with the threshold being the implementation of Basel II in the lender's country. For the pre-Basel II period, *High borrowing rate* is calculated based on the mean of the borrowing rate in the respective period only, while for the post-Basel II period *High borrowing rate* is calculated based on the mean of the borrowing rate in the respective period only. The dependent variable is denoted in the second line of the table and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. In specifications (1)-(5), we conduct the estimation for the period before the implementation of Basel II in the lender's country. In specifications (6)-(10), we conduct the estimation for the period after the implementation of Basel II in the lender's country. All specifications include firm and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Pre-Basel II					Post-Basel II				
	(1) Cash flow	(2) Cash holdings	(3) Return on assets	(4) Total assets	(5) Employee growth	(6) Cash flow	(7) Cash holdings	(8) Return on assets	(9) Total assets	(10) Employee growth
Firm RW downgrade	-0.212 [-0.369]	-0.003*** [-2.879]	-0.003 [-1.136]	0.018 [1.191]	-0.027*** [-8.201]	-5.194*** [-3.468]	-0.007*** [-4.081]	-0.023*** [-7.104]	-0.035** [-2.423]	0.015 [0.853]
High borrowing rate	-0.552 [-0.549]	-0.000 [-0.160]	0.003*** [3.030]	0.021 [1.111]	-0.017** [-2.673]	16.165*** [6.982]	0.005*** [10.265]	0.002 [1.341]	-0.003 [-0.199]	0.015 [1.164]
Observations	5,893	5,975	4,969	5,280	5,576	3,873	3,876	2,380	2,920	3,661
Adj. R-squared	0.928	0.803	0.625	0.946	0.337	0.812	0.863	0.695	0.970	0.370
Firm and macro controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 12. Real effects for downgraded firms. Differential effect of high borrowing costs

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion *Firm RW downgrade* (i.e., a binary variable equal to one for a downgrade in the firm's risk-weighting category, and zero otherwise), and *High borrowing rate* (i.e., a binary variable equal to one if the borrowing rate in the borrower's country is within the 75th percentile of the borrowing rate in our sample, and zero otherwise). The estimation is conducted for different subperiods with the threshold being the implementation of Basel II in the lender's country. For the pre-Basel II period, *High borrowing rate* is calculated based on the mean of the borrowing rate in the respective period only, while for the post-Basel II period *High borrowing rate* is calculated based on the mean of the borrowing rate in the respective period only. The dependent variable is denoted in the second line of the table and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. In specifications (1)-(5), we conduct the estimation for the period before the implementation of Basel II in the lender's country. In specifications (6)-(10), we conduct the estimation for the period after the implementation of Basel II in the lender's country. All specifications include firm and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Pre-Basel II					Post-Basel II				
	(1) Cash flow	(2) Cash holdings	(3) Return on assets	(4) Total assets	(5) Employee growth	(6) Cash flow	(7) Cash holdings	(8) Return on assets	(9) Total assets	(10) Employee growth
Firm RW downgrade	-2.402 [-1.034]	-0.005 [-1.511]	-0.001 [-0.138]	0.136*** [5.260]	-0.028 [-1.597]	6.919 [1.461]	0.008 [1.315]	0.010 [0.675]	0.370*** [4.758]	0.126*** [3.069]
High borrowing rate	-0.617 [-0.612]	-0.000 [-0.214]	0.001 [0.579]	0.040** [2.482]	-0.021*** [-3.272]	16.746*** [8.772]	0.005*** [15.651]	0.004** [2.808]	-0.003 [-0.190]	0.017 [1.607]
Firm RW downgrade × High borrowing rate	2.811 [1.246]	0.002 [0.666]	-0.001 [-0.072]	-0.179*** [-7.363]	0.001 [0.056]	-14.510*** [-3.644]	-0.021*** [-3.392]	-0.027* [-1.982]	-0.401*** [-5.449]	-0.126*** [-3.159]
Observations	5,898	5,978	5,012	5,292	5,581	3,837	3,841	2,375	2,931	3,618
Adj. R-squared	0.916	0.805	0.573	0.948	0.342	0.812	0.860	0.696	0.961	0.379
Firm and macro controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 13. Lending relationships

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Relationship lending* (i.e., a binary variable equal to one for a prior lending relationship between the lender and the borrower during the previous 3-year period, and zero otherwise). The estimation is conducted for different subperiods with the threshold being the implementation of Basel II in the lender's country. Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specifications (1) and (4), we exclusively interact *Firm rating* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Relationship lending*. In specifications (2) and (5), we exclusively interact *Firm downgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Relationship lending*. In specifications (3) and (6), we exclusively interact *Firm upgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Relationship lending*. In specifications (1)-(3) we conduct the estimation for the period before the implementation of Basel II in the lender's country, and in the specifications (4)-(6) for the period after the implementation of Basel II in the lender's country. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Pre-Basel II			Post-Basel II		
	(1)	(2)	(3)	(4)	(5)	(6)
Firm rating × Firm RW	8.718*** [4.400]			10.765*** [2.643]		
Firm rating × Firm NRW	6.669*** [3.117]			5.920** [2.298]		
Firm rating × Firm RW × Relationship lending	-4.883 [-1.613]			-9.690* [-1.850]		
Firm downgrade × Firm RW		8.451*** [3.118]			15.981*** [2.669]	
Firm downgrade × Firm NRW		7.697** [2.300]			7.391* [1.920]	
Firm downgrade × Firm RW × Relationship lending		-5.901 [-1.342]			-13.796* [-1.818]	
Firm upgrade × Firm RW			-4.679** [-1.988]			-3.641 [-0.826]
Firm upgrade × Firm NRW			-0.257 [-0.086]			-4.392* [-1.697]
Firm upgrade × Firm RW × Relationship lending			-0.422 [-0.144]			5.295 [0.793]
Observations	15,157	13,483	12,653	11,204	9,624	9,993
Adj. R-squared	0.712	0.715	0.731	0.749	0.754	0.76
Full set of controls	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y
Number of banks	380	364	334	235	219	219
Number of firms	2779	2606	2547	2262	2106	2115

Table 14. Firm heterogeneities. Post-Basel II

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of a number of firm-level characteristics. The estimation is conducted for the period after the implementation of Basel II in the lender's country. Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specification (1), we double-interact *Firm downgrade* and *Firm RW* with *Firm return on assets*. In specification (2), we double-interact *Firm downgrade* and *Firm RW* with *Profitability*. In specification (3), we double-interact *Firm downgrade* and *Firm RW* with *Number of employees*. In specification (4), we double-interact *Firm downgrade* and *Firm RW* with *Cash flows*. In specification (5), we double-interact *Firm downgrade* and *Firm RW* with *Retained earnings*. In specification (6), we double-interact *Firm downgrade* and *Firm RW* with *Total debt*. In specification (7), we double-interact *Firm downgrade* and *Firm RW* with *Firm Leverage*. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm downgrade × Firm RW	12.437*** [2.734]	23.471*** [3.267]	19.295*** [3.382]	16.612*** [3.367]	16.010*** [3.166]	13.403** [2.467]	-31.044*** [-3.020]
Firm downgrade × Firm NRW	8.843** [2.270]	16.860*** [4.164]	10.831*** [2.797]	10.352*** [2.612]	11.635*** [3.022]	15.599*** [3.859]	12.744*** [3.380]
Firm downgrade × Firm RW × Firm return on assets	-80.058** [-2.207]						
Firm downgrade × Firm RW × Profitability		-112.172** [-2.342]					
Firm downgrade × Firm RW × Number of employees			-0.058** [-2.182]				
Firm downgrade × Firm RW × Cash flows				-0.001* [-1.761]			
Firm downgrade × Firm RW × Retained earnings					-0.000** [-2.067]		
Firm downgrade × Firm RW × Total debt						0.009* [1.693]	
Firm downgrade × Firm RW × Firm Leverage							113.192*** [3.970]
Observations	9,624	6,476	7,800	7,702	7,999	6,820	9,624
Adj. R-squared	0.754	0.745	0.752	0.746	0.753	0.742	0.735
Full set of controls	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y	Y
Number of banks	219	168	192	192	202	171	219
Number of firms	2106	1389	1745	1730	1755	1450	2106

Table 15. Firm heterogeneities: Different percentiles. Post-Basel II

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of binary variables for a number of firm-level characteristics if these characteristics are within each of the four 25th percentiles in our sample. The estimation is conducted for the period after the implementation of Basel II in the lender's country. Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. Column (1) presents the coefficients on the double interaction of *Firm downgrade* with *Firm RW* and *Firm NRW* along with the coefficient on the triple interaction of *Firm downgrade* with *Firm RW* and each of the firm-level characteristics for the full sample. Column (2) presents the coefficients on the double interaction of *Firm downgrade* with *Firm RW* and *Firm NRW* along with the coefficient on the triple interaction of *Firm downgrade* with *Firm RW* and a binary variable equal to one if each of the firm-level characteristics is within the 1st 25th percentile in our sample, and zero otherwise. Column (3) presents the coefficients on the double interaction of *Firm downgrade* with *Firm RW* and *Firm NRW* along with the coefficient on the triple interaction of *Firm downgrade* with *Firm RW* and a binary variable equal to one if each of the firm-level characteristics is within the 2nd 25th percentile in our sample, and zero otherwise. Column (4) presents the coefficients on the double interaction of *Firm downgrade* with *Firm RW* and *Firm NRW* along with the coefficient on the triple interaction of *Firm downgrade* with *Firm RW* and a binary variable equal to one if each of the firm-level characteristics is within the 3rd 25th percentile in our sample, and zero otherwise. Column (5) presents the coefficients on the double interaction of *Firm downgrade* with *Firm RW* and *Firm NRW* along with the coefficient on the triple interaction of *Firm downgrade* with *Firm RW* and a binary variable equal to one if each of the firm-level characteristics is within the 4th 25th percentile in our sample, and zero otherwise. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Full sample	(2) 1 st 25 th percentile	(3) 2 nd 25 th percentile	(4) 3 rd 25 th percentile	(5) 4 th 25 th percentile
Firm downgrade × Firm RW	12.437***	11.823**	11.145**	11.893**	14.941***
Firm downgrade × Firm NRW	8.843**	10.712**	10.640**	10.656**	8.716**
Firm downgrade × Firm RW × Firm return on assets	-80.058**	1.087	5.871	7.731	-106.771**
Firm downgrade × Firm RW	16.727**	11.582**	11.752**	8.141*	18.561***
Firm downgrade × Firm NRW	12.455***	7.282*	7.240*	7.131*	12.875***
Firm downgrade × Firm RW × Cash holdings	22.245	-8.281	-6.748	19.263	-17.907**
Firm downgrade × Firm RW	16.010***	4.967	11.257**	14.689***	13.642**
Firm downgrade × Firm NRW	11.635***	7.391*	7.299*	7.171*	7.307*
Firm downgrade × Firm RW × Retained earnings	-0.000**	20.824**	-2.468	-24.361**	-6.744
Firm downgrade × Firm RW	17.744***	0.414	9.005*	12.185**	18.058***
Firm downgrade × Firm NRW	10.845***	7.078*	7.365*	7.248*	7.263*
Firm downgrade × Firm RW × Asset growth	-26.333	20.519**	15.279	-8.552	-33.655***
Firm downgrade × Firm RW	17.322***	5.190	7.975	10.099**	18.891***
Firm downgrade × Firm NRW	9.667**	7.232*	7.297*	7.302*	7.262*
Firm downgrade × Firm RW × PPE growth	-17.749	12.286	13.239	9.192	-33.117***
Firm downgrade × Firm RW	13.403**	12.103**	13.783***	11.495**	1.360
Firm downgrade × Firm NRW	15.749***	7.278*	6.972*	7.305*	7.189*
Firm downgrade × Firm RW × Total debt	6.867***	-14.708	-22.550*	-2.655	17.643**

Firm downgrade × Firm RW	-31.044***	16.381***	15.533***	17.790***	1.062
Firm downgrade × Firm NRW	12.744***	12.520***	12.374***	12.329***	12.591***
Firm downgrade × Firm RW × Firm Leverage	113.192***	-16.656**	-17.250	-14.841*	46.025***

Table 16. Firm heterogeneities: Different percentiles. Post-Basel II

The table reports values across the three 25th percentiles for the firm-level characteristics employed in the estimations of Table 15.

	(1) 25 th percentile	(2) 50 th percentile	(3) 75 th percentile
Firm return on assets	0.017	0.056	0.133
Cash holdings	0.015	0.042	0.093
Retained earnings (millions)	-67.585	538.000	3,253.500
Asset growth	-0.027	0.040	0.120
PPE growth	-0.039	0.030	0.111
Total debt (millions)	561.121	1660.334	6429.116
Firm Leverage	0.274	0.366	0.469

Table A1. Variable definitions and sources

Variable	Description	Source
<i>A. Dependent variables in main specifications</i>		
AISD	All-in spread drawn, defined as the sum of the spread over LIBOR plus any facility fee.	DealScan
AISU	All-in spread undrawn, defined as the sum of the facility fee and the commitment fee.	DealScan
<i>B. Main explanatory variables: Firm credit ratings</i>		
Firm rating	The change in the borrower's numerical credit rating in the year before the loan facility's origination year.	S&P Credit Ratings
Firm downgrade dummy	A binary variable equal to one, if the borrower's credit rating is downgraded in the year before the loan facility's origination year, and zero otherwise.	S&P Credit Ratings
Firm downgrade	The positive changes (i.e., a deterioration in the borrower's credit rating) and non-changes (i.e., the borrower retains the same credit rating) in the borrower's numerical credit rating in the year before the loan facility's origination year.	S&P Credit Ratings
Firm upgrade	The negative changes (i.e., an improvement in the borrower's credit rating) and non-changes (i.e., the borrower retains the same credit rating) in the borrower's numerical credit rating in the year before the loan facility's origination year.	S&P Credit Ratings
Firm RW	A binary variable equal to one, if the borrower's credit rating change leads to a change in the borrower's risk-weighting category in the year before the loan facility's origination year, and zero otherwise.	S&P Credit Ratings
Firm NRW	A binary variable equal to one, if the borrower's credit rating change leads to a non-change in the borrower's risk-weighting category in the year before the loan facility's origination year, and zero otherwise.	S&P Credit Ratings
Firm RW downgrade	A binary variable equal to one, if the borrower's credit rating change leads to a downgrade in the borrower's risk-weighting category in the year before the loan facility's origination year, and zero otherwise.	S&P Credit Ratings
<i>C. Main explanatory variables: Firm credit ratings</i>		
Sov rating	The change in the borrower's country numerical credit rating in the year before the loan facility's origination year.	S&P Credit Ratings
Sov RW	A binary variable equal to one, if the borrower's country credit rating change leads to a change in the borrower's country risk-weighting category in the year before the loan facility's origination year, and zero otherwise.	S&P Credit Ratings
Sov NRW	A binary variable equal to one, if the borrower's country credit rating change leads to a non-change in the borrower's country risk-weighting category in the year before the loan facility's origination year, and zero otherwise.	S&P Credit Ratings
<i>D. Explanatory variables: Loan characteristics</i>		
Loan amount	Log of the loan facility amount in USD.	DealScan
Maturity	Loan duration in months.	DealScan
Collateral	A binary variable equal to one if the loan is secured with collateral, zero otherwise.	DealScan
Number of lenders	The number of banks involved in the syndicated loan.	DealScan
Performance provisions	A binary variable equal to one if the loan has performance pricing provisions, zero otherwise.	DealScan
General covenants	The total number of covenants in the loan contract.	DealScan
Loan purpose	A series of binary variables indicating loan purpose (e.g., corporate purpose, debt repay, etc.).	DealScan
Loan type	A series of binary variables indicating loan type (e.g., term loans, revolvers, etc.).	DealScan
Relationship lending	A binary variable equal to one for a prior loan facility between the lender and the borrower in the 3-year period before the loan facility's origination year, zero otherwise.	DealScan
<i>E. Explanatory variables: Lender characteristics</i>		
Bank return on assets	The return on total bank assets.	Compustat

Bank size	The log of total bank assets.	Compustat
Bank NPLs	The ratio of non-performing loans to total loans.	Compustat

F. Explanatory variables: Borrower characteristics

Firm return on assets	The return on total firm assets.	Compustat
Firm Tobin's Q	The ratio of the market value of firm assets to the book value of assets.	Compustat
Firm leverage	The ratio of total firm debt to total assets.	Compustat
Cash flows	The firm income before extraordinary items in million USD.	Compustat
Cash holdings	The ratio of firm cash holdings to total assets.	Compustat
Firm total assets	The log of total firm assets.	Compustat
Number of employees	The number of firm employees.	Compustat
Profitability	The inverse return on total firm assets.	Compustat
Retained earnings	The firm retained earnings in million USD.	Compustat
Total debt	The total firm debt in million USD.	Compustat
Asset growth	The growth in total firm assets.	Compustat
PPE growth	The growth in firm property, plant and equipment.	Compustat

G. Explanatory variables: Differences between the lender and borrower countries

GDP per capita	The difference in annual GDP per capita in constant prices between the lender's and the borrower's countries.	WDI
GDP growth	The difference in annual GDP growth rate (%) between the lender's and the borrower's countries.	WDI

H. Explanatory variables: Lender's country

Basel II	A binary variable equal to one for the implementation of Basel II in the lender's country, and zero otherwise.	Own estimations
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I. Explanatory variables: Borrower's country

High borrowing rate	A binary variable equal to one if the borrowing rate in the borrower's country is within the 75 th percentile of the borrowing rate in our sample, and zero otherwise.	DealScan
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Table A2. Numerical conversions of firm credit ratings

The table presents the conversions of firm credit ratings to numerical credit ratings and numerical risk-weighting categories.

Rating	Numerical rating	Risk-weighting category
AAA	1	1
AA+	2	1
AA	3	1
AA-	4	1
A+	5	2
A	6	2
A-	7	2
BBB+	8	3
BBB	9	3
BBB-	10	3
BB+	11	3
BB	12	3
BB-	13	3
B+	14	4
B	15	4
B-	16	4
CCC+	17	4
CCC	18	4
CCC-	19	4
CC	20	4
C	21	4
D/SD	22	4

Table A3. Baseline results with different controls

The table reports coefficients and t-statistics [in brackets]. Different specifications include different loan-, firm-, bank-, and country-level controls. Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Firm rating	6.952*** [5.986]	6.852*** [5.998]	6.503*** [5.724]	6.577*** [5.296]	7.781*** [6.785]	6.934*** [5.714]
Loan amount		-7.826*** [-7.966]		-6.139*** [-5.691]	-3.686*** [-3.411]	-3.587*** [-3.349]
Maturity		0.239*** [4.573]		0.331*** [6.032]	0.256*** [4.483]	0.221*** [4.040]
Collateral		27.053*** [7.751]		27.905*** [7.454]	24.350*** [6.780]	24.579*** [6.644]
Number of lenders			-1.006*** [-8.505]	-0.945*** [-7.399]	-0.830*** [-6.345]	-0.811*** [-6.189]
Performance provisions			-29.539*** [-13.525]	-31.877*** [-13.889]	-30.681*** [-13.608]	-30.276*** [-12.623]
General covenants			4.980*** [4.816]	3.030*** [2.735]	3.110*** [2.938]	3.736*** [3.268]
Bank return on assets	-164.557*** [-5.929]	-158.566*** [-5.766]	-159.049*** [-5.786]	-134.949*** [-4.459]	-117.038*** [-4.176]	-117.793*** [-4.002]
Bank size	-0.057 [-0.148]	0.041 [0.109]	-0.048 [-0.126]	0.331 [0.777]	0.128 [0.305]	0.251 [0.601]
Bank NPLs	138.918*** [5.556]	133.300*** [5.378]	136.150*** [5.513]			
Firm return on assets	-113.792*** [-4.733]	-108.178*** [-4.566]	-112.080*** [-4.800]	-105.945*** [-4.345]	-226.972*** [-10.278]	-228.459*** [-9.416]
Firm Tobin's Q	-36.956*** [-10.713]	-35.679*** [-10.818]	-35.731*** [-10.429]	-32.409*** [-9.368]	-33.043*** [-9.967]	-34.682*** [-10.145]
Firm leverage	185.573*** [12.404]	178.293*** [12.055]	180.291*** [12.335]	175.686*** [11.411]		
GDP per capita	-0.003*** [-2.688]	-0.003*** [-2.622]	-0.003*** [-2.649]	-0.003** [-2.557]	-0.002 [-0.770]	
GDP growth	-0.748 [-0.994]	-0.603 [-0.810]	-0.423 [-0.566]	0.032 [0.032]	-1.246 [-0.710]	
Bank capital				82.627*** [2.613]	64.295** [2.154]	80.301** [2.573]
Firm total assets					-44.836*** [-5.884]	-54.092*** [-9.171]
Trade balance						-0.001** [-2.169]
Inflation						-9.964*** [-3.855]
VIX						1.058*** [6.097]
Constant	188.072*** [22.025]	315.889*** [15.384]	203.166*** [23.630]	284.773*** [12.841]	696.533*** [11.560]	746.290*** [15.091]
Observations	27,421	27,396	27,421	22,553	22,552	19,545
Adj. R-squared	0.703	0.708	0.710	0.712	0.742	0.756
Fixed effects	Y	Y	Y	Y	Y	Y
Number of banks	531	528	531	463	462	398
Number of firms	3993	3989	3993	3625	3625	3226

Table A4. Response of spreads to risk weight changes

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Firm RW* (i.e., a binary variable equal to one for a change in the firm's risk-weighting category, and zero otherwise) and *Firm NRW* (i.e., a binary variable equal to one for a non-change in the firm's risk-weighting category, and zero otherwise). Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specification (1), we exclusively interact *Firm rating* with *Firm RW* and *Firm NRW* respectively. In specification (2), we exclusively interact *Firm downgrade* with *Firm RW* and *Firm NRW* respectively. In specification (3), we exclusively interact *Firm upgrade* with *Firm RW* and *Firm NRW* respectively. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)
Firm rating × Firm RW	7.774*** [5.264]		
Firm rating × Firm NRW	5.299*** [3.286]		
Firm downgrade × Firm RW		9.324*** [4.191]	
Firm downgrade × Firm NRW		8.372*** [3.105]	
Firm upgrade × Firm RW			-3.228** [-2.201]
Firm upgrade × Firm NRW			0.360 [0.201]
Observations	27,396	24,114	23,656
Adj. R-squared	0.713	0.716	0.730
Full set of controls	Y	Y	Y
Fixed effects	Y	Y	Y
Number of banks	528	505	482
Number of firms	3989	3777	3718

Table A5. Asymmetric response of collateral to risk weight changes and the role of Basel II

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Firm RW* (i.e., a binary variable equal to one for a change in the firm's risk-weighting category, and zero otherwise), *Firm NRW* (i.e., a binary variable equal to one for a non-change in the firm's risk-weighting category, and zero otherwise), and *Basel II* (i.e., a binary variable equal to one if Basel II is implemented in the lender's country, and zero otherwise). The estimation is conducted for the full sample of loans and certain subsamples of loans. Dependent variable is *Collateral* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specifications (1)-(4), we exclusively interact *Firm downgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Basel II*. In specifications (5)-(8), we exclusively interact *Firm upgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Basel II*. In specifications (1) and (5), we include all loans. In specifications (2) and (6), we exclude loans from US lenders. In specifications (3) and (7), we only include loans from US lenders. In specification (4) and (8), we only include loans from US lenders to US borrowers. All specifications include loan purpose and type, year, bank and firm fixed effects. Specifications (3) and (7) additionally include borrower's country fixed effects. Specifications (1), (2), (5) and (6) additionally include lender's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) All loans	(2) Non-US lenders	(3) US lenders	(4) US loans	(5) All loans	(6) Non-US lenders	(7) US lenders	(8) US loans
Firm downgrade × Firm RW	-0.001 [-0.063]	-0.026 [-1.584]	0.006 [0.700]	0.010 [1.097]				
Firm downgrade × Firm NRW	0.006 [0.732]	0.004 [0.108]	0.005 [0.597]	0.006 [0.753]				
Firm downgrade × Firm RW × Basel II	0.019 [1.491]	0.042** [1.998]	0.013 [0.728]	0.005 [0.255]				
Firm downgrade × Firm NRW × Basel II	0.019 [1.498]	0.028 [0.711]	0.019 [1.328]	0.019 [1.303]				
Firm upgrade × Firm RW					-0.022** [-1.990]	-0.012 [-1.308]	-0.025 [-1.599]	-0.024 [-1.495]
Firm upgrade × Firm NRW					-0.002 [-0.159]	-0.007 [-0.531]	-0.002 [-0.168]	-0.008 [-0.609]
Firm upgrade × Firm RW × Basel II					0.005 [0.235]	-0.017 [-0.564]	0.012 [0.534]	0.012 [0.530]
Firm upgrade × Firm NRW × Basel II					-0.008 [-0.460]	-0.023 [-1.052]	0.016 [0.770]	0.024 [1.183]
Basel II	-0.002 [-0.049]	0.138* [1.650]			-0.007 [-0.193]	0.096 [1.211]		
Observations	23,052	6,539	16,513	15,580	22,534	6,707	15,879	14,900
Adj. R-squared	0.716	0.798	0.708	0.707	0.714	0.792	0.706	0.706
Full set of controls	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	N	Y	Y	Y	N
Number of banks	467	185	282	267	445	182	263	245
Number of firms	3640	1490	2792	2550	3580	1512	2713	2473

Table A6. Heckman sample-selection model

The table reports coefficients and t-statistics [in brackets] from Heckman's (1979) sample-selection model. The dependent variable is in the second line of each panel and all variables are defined in Table A1. Estimation method in Panel A is maximum likelihood and in Panel B is OLS with standard errors clustered by firm. Panel A reports the estimates from the first-stage probit model to estimate the determinants of the firm's loan-taking decision. Panel B reports the estimates from the second-stage OLS regression for the effect of firm credit rating changes on loan spreads. Each of the specifications in Panel B includes the inverse mills ratio (*Lambda*) from the corresponding specification in Panel A. The lower part of Panel B denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. All specifications in Panel A include loan purpose and type, year, bank, firm, lender's country and borrower's country dummies. All specifications in Panel B include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

<u>Panel A: The loan-taking decision by the firm</u>			
	(1)	(2)	(3)
	Loan deal	Loan deal	Loan deal
Firm return on assets	-0.567*** [-5.389]	-0.567*** [-5.389]	-0.567*** [-5.389]
Firm Tobins' Q	-0.044** [-2.454]	-0.044** [-2.454]	-0.044** [-2.454]
Firm leverage	0.296*** [6.882]	0.296*** [6.882]	0.296*** [6.882]
Firm total assets	-0.017*** [-3.909]	-0.017*** [-3.909]	-0.017*** [-3.909]
Firm rating	-0.187*** [-15.242]	-0.187*** [-15.242]	-0.187*** [-15.242]
Loan amount	0.006 [0.905]	0.006 [0.905]	0.006 [0.905]
Maturity	-0.002*** [-8.345]	-0.002*** [-8.345]	-0.002*** [-8.345]
Collateral	0.068*** [3.330]	0.068*** [3.330]	0.068*** [3.330]
Number of lenders	0.001 [1.195]	0.001 [1.195]	0.001 [1.195]
Performance provisions	0.153*** [7.017]	0.153*** [7.017]	0.153*** [7.017]
General covenants	0.057*** [7.744]	0.057*** [7.744]	0.057*** [7.744]
Term loan	-0.078*** [-4.157]	-0.078*** [-4.157]	-0.078*** [-4.157]
Bank return on assets	0.322 [0.865]	0.322 [0.865]	0.322 [0.865]
Bank size	-0.003 [-0.495]	-0.003 [-0.495]	-0.003 [-0.495]
Bank NPLs	0.110 [0.316]	0.110 [0.316]	0.110 [0.316]
Bank loans	5.840*** [15.851]	5.840*** [15.851]	5.840*** [15.851]
Firm loans	83.195** [2.264]	83.195** [2.264]	83.195** [2.264]
Bank-firm loans	-164.585*** [-2.824]	-164.585*** [-2.824]	-164.585*** [-2.824]
Constant	-303.439*** [-79.371]	-303.439*** [-79.371]	-303.439*** [-79.371]
Observations	37,268	37,268	37,268
Dummies	Y	Y	Y

Panel B: The effect of credit rating changes on loan spreads

	(1) AISD	(2) AISD	(3) AISD
Firm rating	2.001 [1.464]		
Firm rating × Firm downgrade dummy	7.305** [2.142]		
Firm downgrade		8.781*** [4.963]	
Firm upgrade			-0.899 [-0.681]
Firm downgrade dummy	0.484 [0.091]		
Loan amount	-5.107*** [-5.468]	-4.794*** [-4.801]	-5.025*** [-5.247]
Maturity	0.197*** [3.409]	0.220*** [3.626]	0.191*** [3.206]
Collateral	28.041*** [8.222]	26.498*** [7.126]	26.699*** [7.786]
Number of lenders	-0.851*** [-7.353]	-0.925*** [-7.805]	-0.706*** [-6.508]
Performance provisions	-26.468*** [-11.919]	-28.614*** [-11.983]	-21.506*** [-9.842]
General covenants	3.943*** [3.807]	3.976*** [3.550]	2.447** [2.324]
Bank return on assets	-137.961*** [-5.135]	-137.071*** [-4.707]	-90.871*** [-3.469]
Bank size	-0.164 [-0.444]	-0.218 [-0.544]	0.077 [0.205]
Bank NPLs	131.914*** [5.424]	130.629*** [4.955]	117.724*** [4.907]
Firm return on assets	-120.527*** [-5.359]	-110.872*** [-4.492]	-140.637*** [-5.873]
Firm Tobin's Q	-33.770*** [-10.589]	-35.064*** [-10.001]	-30.114*** [-9.311]
Firm leverage	166.974*** [12.296]	172.247*** [11.595]	159.034*** [11.706]
GDP per capita	-0.003** [-2.562]	-0.003** [-2.561]	-0.004*** [-3.644]
GDP growth	-0.322 [-0.443]	0.317 [0.373]	-0.218 [-0.295]
Lambda	51.634*** [3.677]	29.683* [1.924]	45.390*** [3.092]
Constant	264.639*** [13.254]	267.367*** [12.612]	254.325*** [12.550]
Observations	27,386	24,104	23,649
Adj. R-squared	0.718	0.720	0.733
Fixed effects	Y	Y	Y
Number of banks	527	504	481
Number of firms	3989	3777	3717

Table A7. Monetary policy stance

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Shadow rate* (i.e., the quarterly shadow short rate in the lender's country). Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specification (1), we exclusively interact *Firm rating* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Shadow rate*. In specification (2), we exclusively interact *Firm downgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Shadow rate*. In specification (3), we exclusively interact *Firm upgrade* with *Firm RW* and *Firm NRW* respectively, and further interact each double interaction term with *Shadow rate*. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)
Firm rating × Firm RW	9.818*** [4.983]		
Firm rating × Firm NRW	5.615*** [3.238]		
Firm rating × Firm RW × Shadow rate	-0.967* [-1.873]		
Firm downgrade × Firm RW		13.463*** [4.753]	
Firm downgrade × Firm RW		8.770*** [3.109]	
Firm downgrade × Firm RW × Shadow rate		-1.540** [-2.196]	
Firm upgrade × Firm RW			-1.727 [-0.740]
Firm upgrade × Firm RW			0.305 [0.148]
Firm upgrade × Firm RW × Shadow rate			-1.027* [-1.751]
Observations	23,511	20,705	20,229
Adj. R-squared	0.721	0.725	0.739
Full set of controls	Y	Y	Y
Fixed effects	Y	Y	Y
Number of banks	445	424	403
Number of firms	3567	3376	3319

Table A8. Different clustering of standard errors

The table reports coefficients and t-statistics [in brackets]. Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS. The penultimate part of the table denotes the type of standard error clustering (B&F&Y refers to Bank and Firm and Year). The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Firm rating	6.421*** [7.005]	6.421*** [5.229]	6.421*** [5.166]	6.421*** [5.166]	6.421*** [5.376]
Loan amount	-5.584*** [-6.922]	-5.584*** [-4.431]	-5.584*** [-4.348]	-5.584*** [-4.348]	-5.584*** [-3.917]
Maturity	0.257*** [5.350]	0.257*** [4.188]	0.257*** [4.103]	0.257*** [4.103]	0.257*** [5.018]
Collateral	27.702*** [10.059]	27.702*** [6.768]	27.702*** [6.630]	27.702*** [6.630]	27.702*** [6.027]
Number of lenders	-0.879*** [-9.825]	-0.879*** [-7.606]	-0.879*** [-7.193]	-0.879*** [-7.193]	-0.879*** [-5.505]
Performance provisions	-29.035*** [-17.793]	-29.035*** [-11.157]	-29.035*** [-10.769]	-29.035*** [-10.769]	-29.035*** [-7.690]
General covenants	2.786*** [3.443]	2.786*** [2.972]	2.786*** [2.704]	2.786*** [2.704]	2.786* [1.792]
Bank return on assets	-152.489*** [-5.639]	-152.489*** [-4.907]	-152.489*** [-5.069]	-152.489*** [-5.069]	-152.489*** [-4.304]
Bank size	0.036 [0.092]	0.036 [0.103]	0.036 [0.105]	0.036 [0.105]	0.036 [0.101]
Bank NPLs	131.039*** [5.315]	131.039*** [3.841]	131.039*** [4.018]	131.039*** [4.018]	131.039*** [4.406]
Firm return on assets	-108.337*** [-6.056]	-108.337*** [-6.118]	-108.337*** [-5.359]	-108.337*** [-5.359]	-108.337*** [-4.375]
Firm Tobin's Q	-34.720*** [-15.111]	-34.720*** [-7.185]	-34.720*** [-7.120]	-34.720*** [-7.120]	-34.720*** [-8.055]
Firm leverage	173.767*** [17.046]	173.767*** [11.080]	173.767*** [10.230]	173.767*** [10.230]	173.767*** [7.646]
GDP per capita	-0.003*** [-3.269]	-0.003** [-2.038]	-0.003* [-1.964]	-0.003* [-1.964]	-0.003** [-2.106]
GDP growth	-0.334 [-0.513]	-0.334 [-0.436]	-0.334 [-0.447]	-0.334 [-0.447]	-0.334 [-0.411]
Constant	287.402*** [17.343]	287.402*** [10.553]	287.402*** [10.424]	287.402*** [10.424]	287.402*** [9.148]
Observations	27,396	27,396	27,396	27,396	27,396
Adj. R-squared	0.715	0.714	0.713	0.713	0.713
Fixed effects	Y	Y	Y	Y	Y
Clustering	Loan	Bank	Bank & Firm	Firm & Year	B&F&Y
Number of banks	528	528	528	528	528
Number of firms	3989	3989	3989	3989	3989

Table A9. Weighted least squares

The table reports coefficients and t-statistics [in brackets]. Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is weighted least squares with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specification (1), we weight by the number of loans of the lender to the total number of loans in that year. In specification (2), we weight by the number of loans to the borrower in a year to the total number of loans in that year. In specification (3), we weight by the number of loans between a lender and the borrower's country in a given year to the total number of loans extended in that year. In specification (4), we weight by the number of loans between the lender's country and the borrower's country in a given year to the total number of loans extended in that year. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
Firm rating	5.885*** [4.052]	7.000*** [5.304]	6.827*** [4.156]	6.782*** [4.888]
Loan amount	-6.522*** [-6.281]	-8.496*** [-7.171]	-7.594*** [-6.398]	-9.130*** [-7.023]
Maturity	0.249*** [4.870]	0.262*** [5.189]	0.243*** [5.613]	0.225*** [4.197]
Collateral	33.124*** [7.633]	31.525*** [8.796]	35.361*** [7.726]	32.952*** [8.900]
Number of lenders	-0.640*** [-5.821]	-0.810*** [-6.628]	-0.587*** [-5.016]	-0.746*** [-6.024]
Performance provisions	-25.684*** [-10.353]	-34.075*** [-13.804]	-28.712*** [-10.472]	-35.530*** [-13.760]
General covenants	2.977*** [2.600]	4.391*** [3.944]	3.650*** [3.071]	4.778*** [4.155]
Bank return on assets	-122.122*** [-4.222]	-145.424*** [-4.828]	-106.058*** [-3.457]	-136.443*** [-4.343]
Bank size	0.032 [0.074]	0.152 [0.370]	0.240 [0.523]	0.210 [0.487]
Bank NPLs	85.330*** [3.186]	114.555*** [4.100]	42.693 [1.543]	91.663*** [3.120]
Firm return on assets	-78.797** [-2.500]	-101.188*** [-3.950]	-86.039*** [-2.725]	-109.857*** [-4.178]
Firm Tobin's Q	-27.077*** [-7.602]	-30.310*** [-9.093]	-23.352*** [-6.747]	-27.680*** [-8.320]
Firm leverage	157.449*** [9.989]	139.339*** [9.790]	142.568*** [9.966]	130.344*** [9.169]
GDP per capita	-0.003** [-2.166]	-0.000 [-0.162]	-0.009** [-2.543]	-0.009*** [-2.988]
GDP growth	-0.677 [-0.697]	-1.257 [-1.220]	0.189 [0.079]	0.831 [0.388]
Constant	277.959*** [12.753]	343.815*** [14.415]	295.334*** [12.449]	357.737*** [13.905]
Observations	27,396	27,396	27,396	27,396
Adj. R-squared	0.747	0.725	0.756	0.730
Fixed effects	Y	Y	Y	Y
Number of banks	528	528	528	528
Number of firms	3989	3989	3989	3989

Table A10. Timing of the downgrade event

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of *Event distance* (i.e., the distance between the loan facility start date and the corporate credit rating downgrade within the year). Dependent variable is *AISD* and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm. The lower part of the table denotes the number of unique lenders (Number of banks) and borrowers (Number of firms) entering each specification. In specifications (1) and (4), *Event distance* is a continuous variable measuring the days between the loan facility start date and the corporate credit rating downgrade. In specifications (2) and (5), *Event distance* is a continuous variable measuring the quarters between the loan facility start date and the corporate credit rating downgrade. In specifications (3) and (6), *Event distance* is a binary variable equal to one if the corporate credit rating downgrade occurred 6 months before the loan facility start date, and zero otherwise. All specifications include loan purpose and type, year, bank, firm, lender's country and borrower's country fixed effects. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Firm rating × Firm RW	7.681*** [5.212]	7.620*** [5.187]	7.842*** [5.314]			
Firm rating × Firm NRW	5.310*** [3.295]	5.302*** [3.299]	5.340*** [3.319]			
Firm downgrade × Firm RW				8.495*** [3.261]	8.179*** [2.995]	9.832*** [4.335]
Firm downgrade × Firm NRW				7.219** [2.046]	6.777* [1.805]	9.053*** [3.252]
Event distance	0.005 [1.047]	0.823 [1.607]	-3.133 [-0.658]	0.008 [0.735]	1.070 [0.857]	-10.052 [-1.368]
Observations	27,396	27,396	27,396	24,114	24,114	24,114
Adj. R-squared	0.713	0.713	0.713	0.716	0.716	0.716
Full set of controls	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y
Number of banks	528	528	528	528	528	528
Number of firms	3989	3989	3989	3989	3989	3989